GEOGRAPHY

Paper 0460/11
Geographical Themes

Key messages

In order for candidates to perform well on this paper they should:

- Follow the rubric correctly by answering three questions only. One must be chosen from each of ***Sections A, B*** and ***C***.
- Answer all parts of their chosen questions in the spaces provided, including questions which involve the completion of maps or graphs, e.g., **Question 1(b)(i)**.
- Know how to respond to command words and words which indicate the focus and context of each question.
- Write answers of an appropriate length, being guided by the space provided in the answer booklet and the mark allocations of questions.
- Answer with precision and clarity, avoiding vague words or statements which should always be qualified or elaborated (e.g. pollution, overcrowding, resources, facilities).
- Develop ideas or link them to others when extended writing is required in those questions worth five or more marks.
- Interpret various types of source material, including graphs of different types, in order to support ideas. Accurate statistics (with units) should only be used if the question indicates that it is appropriate to do so.
- Interpret photographs, diagrams and maps carefully, referring to relevant evidence in them to support answers.
- Be able to describe differences (e.g. of features shown in photographs) or compare two features or time periods (e.g. of years shown on a line graph) by using comparative words.
- Learn geographical words and terms and use them correctly in answers and when writing definitions.
- Ensure that the answer is based entirely on the resource provided when the word 'only' is used in the question.
- Describe the distribution of a feature (e.g. settlements, deserts, earthquakes) on a map, referring where appropriate to scale, direction and other features.
- Have a wide range of case studies and choose them with care to fit the questions selected.
- Include relevant place-specific information in case studies, without including detail which is not relevant to the question set.
- If extra space is needed to answer a question, use the continuation pages at the end of the question and answer booklet. Ensure that any such answers are clearly labelled with the question numbers (e.g., **3(b)(ii)**) rather than page references.

General comments

The paper discriminated well with marks being distributed across the entire mark range. It was encouraging to see large numbers of candidates performing very well across the paper, showing good geographical knowledge and understanding throughout and handling the skills required with a high level of competence. Most candidates, whilst not performing so consistently across all questions, did make a sound attempt at many parts of their chosen questions. However, as always, a significant minority were less convincing, either in terms of correctly interpreting the questions or in producing detailed, accurate answers, thus enabling the paper to differentiate effectively between candidates of all abilities. Some candidates across the ability range did not score marks consistently as they did not respond correctly to all command words (e.g., 'describe' in **Q.1(a)(iv)** or 'explain' in **Q.5(b)(ii)**). Sometimes important words are **emboldened**, as was the case with 'moving to' in **Q.1(b)(ii)** and 'rural' in **Q.2(c)**. This is done to draw candidates' attention to a significant word(s) which should not be overlooked.

There were rubric errors from some candidates, who tended to only answer the earlier/easier parts of all six questions omitting any attempts at the later, higher scoring questions. In very few cases, candidates attempted to answer all parts of all six questions which resulted in limited explanation in the parts worth more marks.

The presentation of answers from most candidates was acceptable, although the writing of a few candidates was barely legible in parts. Candidates may lose marks if their work cannot be read. Answers were usually in an appropriate amount of detail. Occasionally, answers worth only two or three marks were too long and/or answers to questions worth a higher number of marks were too brief. However, most candidates were guided by the space provided and the mark allocations. Some candidates made use of the lined pages at the end of the booklet; however, some needed to do so only because they had included too much irrelevant material in their answers, particularly in case studies. A few did not clearly indicate which questions they had answered on these lined pages.

Questions 1, 3 and **6** were the most popular questions. There were many good answers seen to all questions, including those requiring extended writing, particularly to the **part (c)** questions on explaining why migration of large numbers has taken place, describing the problems caused by a volcanic eruption, and describing the methods used to supply water. There is an increasing trend to include unnecessary detail in case study questions. This often consists of a general introduction with irrelevant information about the topic being tested (e.g. a detailed generic description of a rural settlement when the question asks about the service provision). Such superfluous detail is not helpful as it is sometimes included at the expense of relevant information and development. The best case study answers seen were from those candidates who wrote with a clear focus on the question, developing or linking ideas and including place-specific information. Weak responses were typically poorly focused with brief lists of simple points (sometimes in bullet points) not all of which were relevant.

The following comments on each individual question will highlight candidates' strengths and weaknesses and are intended to help centres prepare their candidates for future examinations.

Comments on specific questions

Question 1

This session, **Question 1** was even more popular than usual, with the vast majority of candidates choosing it.

(a) (i) The vast majority of candidates read the line graph accurately and gave the correct answer.

(ii) Most candidates described the overall growth clearly, with some then stating accurate statistics to gain full marks.

(iii) This question was generally well answered, with similar numbers of candidates choosing estimates **X** and **Y**, and the question discriminated well. Valid suggestions were made to explain a possible reduction in population (estimate **Y**), largely by reference to reduction of birth rates, although some also mentioned death rates as well. Similarly, a continuing increase (estimate **X**) was explained with reference to birth rates remaining high and death rates reducing. Population change is a function of both birth and death rates and the highest scoring answers referred to both. One common error made by candidates choosing estimate **X** was to state that this estimate mirrored what had happened in the past and so therefore a major change such as estimate **Y** would be unlikely. Whilst this may be true to an extent, candidates were only awarded credit if they provided reasoning for that rate of change.

(iv) This question was well answered and differentiated well. Stronger candidates considered a range of different factors. All mark scheme ideas were seen, the most common being the reference to lack of workforce and demand for products/services and the underuse of resources. Weaker responses tended to focus on one idea only or made simplistic or generalised statements, e.g. there are no workers, areas are abandoned, etc. A few candidates misread the question and wrote about overpopulation or focused more on the structure of the population rather than underpopulation. Some candidates did not gain credit as they made general statements such as lack of services. The issue for many migrants is the affordability of services such as healthcare and education rather than the lack of provision, and this needs to be clearly stated by candidates.

(b) (i) Most candidates were able to clearly define international and internal migration, although some failed to write a good definition for forced or involuntary migration without simply repeating these words.

(ii) This question differentiated well and there were some excellent answers which considered with breadth the positive impacts of migrants on their destination. Weaker responses tended to write repetitively about one benefit, usually the provision of a workforce, without considering other issues. Another common error from those who did not read the question carefully was to write about benefits to the migrants rather than the benefits to the destination country. A few answers were irrelevant as they considered problems for migrants and/or the country and so did not gain any credit.

(c) This was a straightforward case study and differentiated well. The strongest candidates selected appropriate case studies such as Mexico to USA and the Philippines to Singapore, and addressed both the push and pull factors. Whilst some wrote simple lists of pulls and/or pushes, others developed at least three different ideas and then included place detail or statistics to gain full marks. There is still a tendency to answer this type of question entirely by using comparative statistics (e.g. people per doctor, literacy, GNP per capita) rather than making statements. This approach will not gain Level 2 credit unless a sufficiently developed statement is made about those statistics. Statistics should be used to provide place-specific detail and not as an alternative to a clearly developed statement.

Question 2

Few candidates chose to answer this question.

(a) (i) The majority of candidates correctly answered this question.

(ii) Most candidates identified two correct features, particularly the wide roads and the buildings being close together.

(iii) Candidates generally made very good use of the photograph and a whole range of ideas were correctly stated.

(iv) This question differentiated well. Stronger responses considered the problems of urban sprawl for both people and the natural environment, particularly ideas such as increased traffic congestion, air pollution, and deforestation and loss of habitat. Weaker responses did not appear to understand the term urban sprawl or used general terms such as ‘pollution’ or ‘poor quality of life’ which failed to gain credit.

(b) (i) This question was not answered well, with few candidates clearly describing the distribution of settlement shown on the map.

(ii) Some candidates described the importance of water supply or transport. However, many ideas were not well developed here.

(c) This question discriminated well. Stronger responses clearly described and explained the service provision in a named settlement. However, many candidates simply listed the services found in a settlement and did not explain why they are found there. Ideas such as accessibility, population size and the importance of threshold population and profitability of businesses should be clearly stated to explain rural service provision.

Question 3

This question was more popular than **Question 4**.

(a) (i) Most candidates used the map and key to correctly state the earthquake magnitude.

(ii) Many candidates were able to correctly identify the countries using the resource.

(iii) Most candidates made clear comparisons, either by using comparative language such as ‘more fatalities on 26th July’ or by quoting appropriate comparative statistics.

(iv) Most candidates offered one or more valid reasons with references to building stability being the most common correct answer. All mark scheme ideas were seen with differentiation being achieved by the number of different ideas stated by candidates. Common misconceptions included unqualified reference to 'infrastructure', vague references to 'building quality' and the level of development. Another common error was that in countries such as the USA, people can be warned before they evacuate so they can escape.

(b) (i) Many candidates correctly identified the three features shown on the diagram; however, some candidates transposed the terms focus and epicentre.

(ii) This question discriminated well. Destructive plate margins were well understood by some candidates, who explained clearly why earthquakes occur at these plate margins. Some candidates, however, described divergent margins or conservative margins, despite the evidence on **Fig. 3.2** that this is a destructive margin.

(c) This question differentiated well, with some excellent answers clearly explaining the problems caused by volcanic eruptions. Many different examples were seen, including Mt Sinabung as well as more recent Icelandic examples. Whilst weaker answers gave simple lists at Level 1, many achieved Level 2 with more developed ideas, such as atmospheric pollution leading to breathing difficulties, or loss of income due to the destruction of businesses. Despite the question clearly asking for problems, some candidates also wrote about the benefits of volcanoes to people living near them, which failed to gain credit. Whilst high Level 2 marks were achieved by significant numbers of candidates, relatively few gave clear place-specific detail to gain full credit here.

Question 4

This was a less popular question and was answered by a smaller proportion of candidates than **Question 3**.

(a) (i) Whilst many candidates correctly answered this question, some incorrectly chose the first option or ticked more than one option.

(ii) Most candidates gave a valid description of the two photographs of beach material.

(iii) Many candidates showed little understanding of why the cliffs might be eroding rapidly. Many correctly suggested that the waves might be large, whilst more developed answers also considered the softness of the cliff material and the lack of coastal protection measures.

(iv) This question differentiated well. Whilst many candidates were able to identify two different coastal protection measures, many could not clearly explain how each of their stated measures reduce erosion.

(b) (i) Many candidates were not able to describe the main features of the spit on the map beyond the simple idea that it is long and thin. Few used scale or direction to good effect.

(ii) There were some excellent answers which clearly described the processes involved in the formation of a spit. However, weaker answers were less specific and showed little understanding beyond the idea of swash and backwash, although the angle and impact of these was often not clearly understood.

(c) Most candidates could name an appropriate coastal area, although a few candidates named entire countries. There were many excellent and relevant examples local to candidates, especially in Central America and the Caribbean. Most responses related wholly or partly to tourism, although other ideas from the mark scheme were regularly seen. Where several ideas were considered, they were often presented as lists of simple ideas, sometimes in bullet form. This approach tended to achieve Level 1 only as there was no real attempt to develop these ideas. Well developed answers considered three different ideas, and developed each idea clearly, for example, the scenic beauty of the coast leads to employment in the tourist industry, or the development of a port leads to the development of the fishing industry. Where place-specific detail was also given, full marks were gained.

Question 5

This was a popular question and was answered by a slightly smaller proportion of candidates than **Question 6**.

(a) (i) The vast majority of candidates correctly defined subsistence farming, although a few confused the term with commercial farming.

(ii) Most candidates correctly identified the months using the resource.

(iii) Many candidates gained some credit here, although few answers gained full marks. Most correct responses related to being able to grow crops in the dry season and so increase yields. Weaker answers which failed to gain credit simply stated 'to water their crops' or 'to earn money'. It was evident that a few weaker responses did not understand the term irrigation.

(iv) This question discriminated well, and good answers stated two advantages of mixed farming and explained them fully. They often referred to the use of manure to fertilise the crops, or the use of left-over crops to feed the animals, as well as the idea of ensuring that if one product fails, they may have an alternative source of income. Weaker answers just tended to state the advantages rather than explaining them, whilst others give vague general responses, usually about making more money.

(b) (i) Most candidates used the resource to identify that food shortages occur in Africa as well as some parts of Asia and South/Central America. Some answers correctly identified relevant parts of these continents, together with reference to the tropics.

(ii) This question discriminated well. Good answers considered a range of different factors and clearly developed these ideas to gain Level 2 credit. Drought and war were common relevant ideas, although all the mark scheme ideas were seen. Some candidates made the mistake of focusing on just one issue, such as poverty, rather than looking at a range of reasons. Candidates need to develop a number of ideas to access more marks rather than repeating the same idea. It was interesting to see a number of responses referring to global warming, and where these answers were developed to explain why global warming exacerbates food shortages (e.g. by causing drought or floods), credit was gained here. Weaker responses simply stated 'overpopulation' without an explanation as to why this results in food shortages.

(c) This question discriminated well and there were some excellent responses which both described and explained agricultural land use. Candidates often used local examples to good effect, and identified and explained a range of factors such as climate, soil type and accessibility to market. Where the candidate chose an appropriate farm or agricultural system rather than a whole country (e.g. the Prairies rather than Canada, rice cultivation rather than subsistence farming), they could state a number of developed ideas explaining that specific agricultural land use. Weaker answers considered simple ideas such as soil type, but did not develop these ideas with explanation, which led to simple Level 1 statements only, or failed to link these ideas to a specific example.

Question 6

This was a more popular question with a slightly larger proportion of candidates choosing it.

(a) (i) Many candidates answered this correctly, although not all candidates read the graph carefully and so their answers were out of tolerance.

(ii) Most candidates gained both marks by reading the data carefully.

(iii) This question discriminated well, as some candidates had difficulty 'comparing the predicted changes' in China and USA. Many seemed to incorrectly consider that the graph was showing total use of electricity rather than changes in it. Nevertheless many candidates correctly identified the decrease in coal use in USA compared with its increase in China. Candidates who understood what the graph was showing did identify other significant differences, but some had difficulty expressing these as comparisons.

(iv) Well prepared candidates focused on a number of valid mark scheme issues, particularly the growth of population, industry and the use of electricity for domestic purposes and transport (e.g.,

electric vehicles). Weaker responses tended to just focus on one or two reasons or made general statements such as 'development' or 'more money' or 'technology' without any further elaboration. Some candidates wrongly assumed the question was about renewable energy and proceeded to suggest why renewables were predicted to increase in importance.

(b) (i) This question discriminated well. Many good answers considered relevant ideas such as radiation, nuclear waste and the expense of construction. In contrast, there were also many weaker answers with generalised statements referring inaccurately to air pollution, explosions and nuclear weapons. Candidates also incorrectly considered environmental issues such as deforestation, noise and visual pollution, many of which are likely to result from most energy generation schemes.

(ii) This question discriminated well, and some excellent balanced responses were seen. Most candidates chose Plan 2 and they were able to include relevant ideas about this form of renewable energy, considering both the advantages of their choice but also the disadvantages of the two schemes rejected, without simply writing the opposite to points they had already made (e.g. renewable/non-renewable). Relatively few chose Plans 3 and 4; however, most answers gave relevant and correct reasons for their choice. Unfortunately, some candidates chose Plan 1, despite the question stem asking them to choose Plan 2, 3 or 4. A common error was to write about the disadvantages of the plan chosen which did not gain credit.

(c) This was a straightforward case study and differentiated well. The strongest answers selected appropriate case studies such as Lesotho, as well as many examples of water schemes in the Americas. Whilst some candidates gave simple Level 1 ideas, many candidates described in detail ideas such as rainfall harvesting (in the Caribbean) and the use of underground water. Water treatment was, of course, relevant but some candidates focused entirely on that at the expense of the methods then used to supply it to users, whilst others wrote about conservation of water (in the home, for example) which was not what the question was asking.

GEOGRAPHY

Paper 0460/12
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Key messages

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- Answer all parts of their chosen questions in the spaces provided, including questions which involve the completion of maps or graphs, e.g., **Q.1(b)(i).**
- Know how to respond to command words and words which indicate the focus and context of each question.
- Write answers of an appropriate length, being guided by the space provided in the answer booklet and the mark allocations of questions.
- Answer with precision and clarity, avoiding vague words or statements which should always be qualified or elaborated (e.g. pollution, overcrowding, resources, facilities).
- Develop ideas or link them to others when extended writing is required in those questions worth five or more marks.
- Interpret various types of source material, including graphs of different types, in order to support ideas. Accurate statistics (with units) should only be used if the question indicates that it is appropriate to do so.
- Interpret photographs, diagrams and maps carefully, referring to relevant evidence in them to support answers.
- Be able to describe differences (e.g. of features shown in photographs) or compare two features or time periods (e.g. of years shown on a line graph) by using comparative words.
- Learn geographical words and terms and use them correctly in answers and when writing definitions.
- Ensure that the answer is based entirely on the resource provided when the word 'only' is used in the question.
- Describe the distribution of a feature (e.g. settlements, deserts, earthquakes) on a map, referring where appropriate to scale, direction and other features.
- Have a wide range of case studies and choose them with care to fit the questions selected.
- Include relevant place-specific information in case studies, without including detail which is not relevant to the question set.
- If extra space is needed to answer a question, use the continuation pages at the end of the question and answer booklet. Ensure that any such answers are clearly labelled with the question numbers (e.g., **3(b)(ii)**) rather than page references.

General comments

The paper discriminated well with marks being distributed across the entire mark range. It was encouraging to see large numbers of candidates performing very well across the paper, showing good geographical knowledge and understanding throughout and handling the skills required with a high level of competence. Most candidates, whilst not performing so consistently across all questions, did make a sound attempt at many parts of their chosen questions. However, as always, a significant minority were less convincing, either in terms of correctly interpreting the questions or in producing detailed, accurate answers, thus enabling the paper to differentiate effectively between candidates of all abilities. Some candidates across the ability range did not score marks consistently as they did not respond correctly to all command words (e.g., 'describe' in **Q.1(b)(i)** or 'compare' in **Q.2(b)(i)** or key words/terms such as 'natural environment' in **Q.6(b)(ii)** or 'dependent population' in **Q.1(c)**. Sometimes key words are **emboldened**, as was the case with 'countries in Europe' in **Q.1(a)(iv)**. This is done to draw candidates' attention to a significant word(s) which should not be overlooked.

There were rubric errors from some candidates, who tended to only answer the earlier/easier parts of all six questions and omitted any attempt at the later, higher scoring questions. In very few cases, candidates attempted to answer all parts of all six questions with inevitable impacts in terms of brevity and limited explanation in the parts worth more marks.

The presentation of answers from most candidates was acceptable, although the writing of a few candidates was barely legible in parts, and care was not always taken to complete tasks with sufficient accuracy (e.g., **Q.1(b)(i)**). Candidates may be losing marks if their work cannot be read. Answers were usually in an appropriate amount of detail. Occasionally, answers worth only two or three marks were too long and/or answers to questions worth a higher number of marks were too brief. However, most candidates were guided by the space provided and the mark allocations. Some candidates made use of the lined pages at the end of the booklet; however, some needed to do so only because they had included too much irrelevant material in their answers, particularly in case studies. A few did not clearly indicate which questions they had answered on these lined pages.

Questions 1, **3** and **5** were the most popular questions. Mean marks were highest on **Question 1** and lowest on **Question 2**, with marks for the other four questions being in a similar range. There were many good answers seen to most questions, including those requiring extended writing, particularly to the **part (c)** questions on problems caused by a high dependent population, the impacts of a volcanic eruption and river flooding, and the problems caused by tourism. There is an increasing trend to include unnecessary detail in case study questions. This often consists of a general introduction with irrelevant information about the topic being tested (e.g. the cause of a volcanic eruption when the question asks about its impacts). Such superfluous detail is not helpful as it is sometimes included at the expense of relevant information and development. The best case study answers seen were from those candidates who wrote with a clear focus on the question, developing or linking ideas and including place-specific information. Weak responses were typically poorly focused with brief lists of simple points (sometimes in bullet points), not all of which were relevant.

The following comments on each individual question will highlight candidates' strengths and weaknesses and are intended to help centres prepare their candidates for future examinations.

Comments on specific questions

Question 1

This was a very popular question, answered by well over 90 per cent of candidates. It was the highest scoring question for many candidates, although a full spread of marks was seen.

(a) (i) Most candidates ranked the countries correctly.

(ii) Many candidates described two areas, usually on the Morocco to Spain and Libya to Tunisia routes. They described the locations in different ways, but gained credit provided they referred in some way to an appropriate area of sea. Weaker answers referred only to countries, with no mention of the coast or sea area, or used directions such as 'north of Libya' which were imprecise.

(iii) Many candidates understood 'forced' migration and gave appropriate reasons. Other candidates focused on push factors for economic migration which were not accepted.

(iv) Despite 'countries in Europe' being emboldened, some candidates focused too much on the problems of migrants rather than problems for the country. Candidates who did focus correctly on the destination countries usually gained credit by referring to pressures on work, housing or resources such as food or water, housing and jobs. Other popular reasons were issues such as conflict with local people and increasing rates of crime. Marks were lost when candidates gave simplistic statements such as disease, overcrowding and overpopulation.

(b) (i) Many candidates correctly completed the divided bar, although some lost marks by careless plotting of the dividing lines. Candidates need a sharp pencil and a ruler to complete this type of task accurately. Some weaker responses had plotted one or more lines incorrectly and/or left some of the bar unshaded. A few candidates plotted the segments in reverse order, ignoring the pattern shown in the other completed bars, and a significant minority omitted the question entirely.

(ii) Many candidates scored well on this question. They suggested a wide range of problems facing migrants and gained full marks. All ideas suggested in the mark scheme were seen in candidates' answers. Some answers were vague, such as poor quality of life, or they focused on just one issue, such as discrimination, rather than looking at a range of problems. Potential poverty was a valid issue, though candidates could not score multiple marks for listing things which the migrants cannot afford. Similarly, ideas such as lack of healthcare, education and food were not acceptable unless linked with difficulty of access for reasons such as poverty.

(c) The best answers focused on old dependents, especially in Japan but also in European countries such as Italy. Good answers linked ideas well to give developed answers. Answers which focused on young dependents were less successful and frequently went into irrelevant ideas about children working. Some candidates did not understand dependent population and wrote about issues related to overpopulation, most of which were not relevant. Another error made by some candidates was to continue the theme of migration by either writing about the migrants as dependents or the country being dependent on migrant labour.

Question 2

This was the least popular question on the paper, and many of the answers were weak, reflecting the fact that for many candidates it formed part of a rubric error.

(a) (i) Some answers were seen within the wide tolerance, which was allowed, but there were many which were well outside the acceptable range.

(ii) Many candidates gained marks by referring to the CBD and/or the roads. Others correctly observed that the shops and services are spread out through the urban area. A common error was to respond wrongly to the command 'describe the distribution' and to write about other aspects of shops and services.

(iii) Answers varied in relevance. Better answers identified that shops in the CBD would be likely to be larger and more specialist, and some answers included comparative examples. Weaker answers speculated that these shops were more expensive or had more customers, or they simply did not attempt a comparison. The best answers included terminology such as higher order, larger threshold population and wider sphere of influence.

(iv) This question discriminated well. Some candidates suggested different reasons with sound explanations, referring in particular to the location close to large numbers of residents and on a main radial road. Other answers included vague explanations which repeated the same idea of '*more customers*'. Some candidates wrongly suggested that shops were in their locations just to suit customers rather than for the benefit of the shop owners.

(b) (i) Many candidates used the diagram to identify at least one difference between the spheres of influence. Good answers gained full marks by including precise details about the extent of both spheres of influence, some accurately using the scale. Others simply referred to the size of the sphere of influence and some did not make any comparisons, particularly when referring to the CBD and the urban boundary.

(ii) This was challenging for many candidates, especially those who did not understand the term 'sphere of influence'. The most common correct response was about the variety of goods offered, although others did refer to different numbers of the two types of stores and/or frequency of visits.

(c) This was the lowest scoring case study on the paper and relatively few candidates gained high marks. Most answers identified different ways to improve housing but did not describe them in any detail, thus many answers remained within Level 1. Many candidates did not focus on housing but included irrelevant ideas about crime, transport or employment. Many of the higher scoring answers focused on the improvements made to housing in squatter settlements, typically in cities in LEDCs such as in Brazil, Nigeria and India, referring to ideas such as self-help schemes and site and services schemes. Examples in MEDCs were of course acceptable, but few were seen with adequate detail and the correct focus.

Question 3

Almost 90 per cent of candidates answered this question and there was a wide range of marks. Average marks on **Questions 3** and **4** were very similar.

(a) (i) Many candidates gave the correct figure. Some candidates wrote the figure in full (1,200,000), which with the word 'millions' at the end of the line was incorrect.

(ii) Most candidates correctly made the comparisons. Some weak answers reversed their answers by reading the key wrongly or just gave statistics, despite the instruction not to do so.

(iii) Many candidates made at least two valid suggestions, typically about the poor building quality of houses, lack of health care, and lack of education about what to do in an earthquake. Some weak answers did not attempt to link poverty with the consequences of an earthquake.

(iv) The question differentiated well. Better candidates focused on the cost of rebuilding, and identified specific buildings which had been destroyed. Some also referred to unemployment and the death of workforce, often linked to destruction of workplaces. Others considered the impact on production and trade, along with the impact on tourism. Weak answers suggested that '*everything needed re-building*' but gave no details, whilst others wrongly tried to compare the impacts on China and Haiti.

(b) (i) The question discriminated well between candidates. The most common correct responses referred to the plate boundary and fault lines. Better candidates also gave detailed descriptions of where, in Alaska, earthquakes were located and used terms such as 'clustered' or 'linear' in their answers. Some weak answers did not write about the distribution, focussing, for example, on the one earthquake which was 9.0 or larger on the Richter scale, and there were many simplistic references to '*on the plates*', '*in the sea*' and '*in Alaska*'.

(ii) There was a full range in quality of responses from very detailed explanation of the processes causing an earthquake to vague misconceptions about plates colliding and volcanoes triggering earthquakes. Some candidates offered alternative ideas about plates '*converging, diverging or sliding past each other*' which were not credited as **Fig. 3.2** clearly shows a convergent plate margin. Many candidates included correct terms such as 'pressure' and 'friction', some without really showing an understanding of the processes. The best answers used these terms in the correct sequence in order to show a full understanding of why an earthquake occurs.

(c) The question produced a range of responses. Common examples included named volcanoes in Iceland, Mount Merapi, Mount Sinabung, Mount St Helens, Etna and even Vesuvius. Historical examples are accepted; however, it is always good to see more recent examples being used, such as Cumbre Vieja in La Palma, which erupted in 2021. Some candidates limited their maximum mark by giving a location but not the name of a volcano. The question discriminated well as weaker answers gave a lot of simple impacts but did not develop the ideas, whilst higher scoring answers linked ideas together and included place detail, such as accurate dates or place names or numbers of people affected. Some candidates wasted time and space by writing about the cause of the eruption or describing the material coming out of the volcano at the expense of making detailed reference to its impacts.

Question 4

This was the least popular question of the pair. Overall marks and performance, however, were very similar to **Question 3**.

(a) (i) Some candidates identified the cirrus clouds, but many guessed at other types of clouds or made descriptive comments such as 'light' or 'high' clouds.

(ii) Some candidates identified the correct date, 3rd June, and referred correctly to the one okta of cloud cover shown in the table, **Fig. 4.1**, and the photograph, **Fig. 4.2**. Many candidates just stated that there was 'little cloud cover'. Other candidates identified the wrong date, usually 4th June when there was no cloud cover.

(iii) The question discriminated well. Good answers provided detailed explanations of how the maximum and minimum thermometer was used with others gaining at least one mark by referring

to readings being taken daily or putting it in a Stevenson Screen. Many candidates did not explain its use but how it worked.

(iv) Most candidates correctly identified the four weather instruments. The barometer was the one where most errors were made.

(b) (i) Answers varied in quality. Better answers were succinct by identifying the respective high and low amounts of cloud in summer and winter, or the correct named months, and describing the change in spring or autumn. Weak answers simply identified cloud cover in individual months without linking this to seasonal variation.

(ii) A good discriminating question. The best answers gave detailed explanations of how to collect the data on both cloud cover and type, with weak answers typically gaining one mark by reference to doing it every day or taking photographs. This type of data collection had not been experienced by some candidates, whose answers referred to using instruments such as different types of thermometers, rain gauge and sunshine recorder. The use of a quadrat was an answer which was seen from significant numbers of candidates. This was only accepted if candidates explained that it was divided into eight sections and held up to the sky.

(c) Common examples were the Ganges, Nile and Elbe. As in **Question 3(c)**, a common error was to write about the causes of flooding and/or measures to reduce the impact, the consequence being that limited detail of the impacts was provided other than a brief list at Level 1. Good answers included detailed impacts on buildings, farmland, transport, and the spread of water-borne disease, along with appropriate place detail in the very best examples.

Question 5

Question 5 was more popular than **Question 6**, with a range of responses. Overall quality on the pair of questions was very similar.

(a) (i) Most candidates correctly identified Pula, but Rijeka was a common incorrect settlement named.

(ii) Despite the large tolerance, significant numbers of candidates were inaccurate in their measurement, using the scale incorrectly. Most candidates did correctly identify the south-east direction.

(iii) This question differentiated well. Most candidates identified the beach, or an appropriate activity shown in **Fig. 5.2**, such as sailing. Candidates were less successful in identifying the local/traditional/handmade products or souvenirs in **Fig. 5.3**, with many simply suggesting souvenirs or shops. Most candidates answered correctly about **Fig. 5.4** by referring in some way to historical buildings.

(iv) Many candidates identified jobs as the main benefit of tourism. Perceptive candidates also described business income, use of money from tourism to develop specific services or aspects of the infrastructure, and the notion of cultural exchange. Some candidates made vague references to quality of life, money or infrastructure being improved without sufficient precision.

(b) (i) The question gave clear differentiation. Good answers used the graph to identify clear trends and gave correct years with accurate data. Most candidates gained one mark for the '*increase*' idea, though weaker answers had mis-read the scale and gave inaccurate statistics.

(ii) Answers varied in quality. Many candidates identified war and natural disasters as reasons for change. More detailed answers also suggested development of new attractions, economic recession, and special events as other reasons. Weak answers confused annual change with seasonal change and so focused incorrectly on weather or gave vague answers such as '*development*', '*safety*' or '*politics*'. Other weak answers focused on individual tourists whose preference or economic circumstances might change. The idea of publicity was a common one, usually linked to bloggers or influencers rather than advertisements.

(c) Answers varied in quality. The best answers identified a popular tourist area, often a small island country, and described the impacts of different problems on both people and the natural environment, developing or linking several of their ideas. Common case studies included Jamaica, Mauritius, Masai Mara, and cities such as London and Dubai. Whilst some candidates gave

balanced answers, many focused almost exclusively on environmental problems. Many weaker answers referred to issues such as noise, litter and air pollution, for example, but did not describe how these various types of '*pollution*' affected either people or the natural environment.

Question 6

This was the least popular of the two questions in this section and was answered by almost 30 per cent of candidates. Average marks were similar to **Question 5**.

(a) (i) Most answers were within the accepted range.

(ii) Most candidates identified the similarity that service employment was the largest sector, although some candidates answered that '*more*' or '*many*' people were in this sector, which was too vague for credit. Many candidates were also able to identify a difference, with correct ideas often referring to one specific sector such as agriculture. An error made by some candidates was to refer to change rather than the situation in 2020.

(iii) This question was more challenging and discriminated well. Good answers clearly compared changes in the three sectors, including industry. Some candidates described the change in the two countries separately; others, however, did not describe the change at all but just the situation in the two countries in 1990 and 2020, which was not creditable.

(iv) Many candidates found the question difficult, with lots of vague answers referring to development and demand but not giving any specific details. A common misconception was that workers moved from agriculture to services because the pay was better. Correct answers referred to mechanisation, a better educated population with more skills to work in the tertiary sector, and the possible growth of tourism.

(b) (i) Many candidates scored all three marks by accurately completing the table. Where errors were made, however, it was usually due to confusing inputs and outputs.

(ii) The question was a good discriminator. High scoring answers suggested a wide variety of effects on wildlife, habitats, vegetation, biodiversity, air pollution, global warming and acid rain, some of which were developed for additional credit. Common errors included reference to soil becoming infertile rather than eroded, emissions of smoke and fumes rather than a named gas, and ozone depletion rather than global warming.

(c) This produced a range of examples, including many good ones that were local to the candidates, along with a wide range in quality of responses. There were also well rehearsed textbook examples such as Nissan (Sunderland), Toyota (Burnaston, near Derby) and Pakistan Steel Mills (Pipri, near Karachi), along with examples of TNCs in China or a named LEDC. Where the candidate chose an appropriate area or zone rather than a whole country, e.g. Pipri rather than Pakistan, they could often give a range of developed ideas about how that region met the locational requirements of manufacturing industries and incorporate place detail. Many weaker answers knew what the factors of location were but could not convincingly link them to a specific location.

GEOGRAPHY

Paper 0460/13
Geographical Themes

Key messages

In order for candidates to perform well on this paper they should

- Follow the rubric correctly by answering three questions only. One must be chosen from each of ***Sections A, B*** and ***C***.
- Answer all parts of their chosen questions in the spaces provided, including questions which involve the completion of maps or graphs, e.g., **Question 1(b)(i)**.
- Know how to respond to command words and words which indicate the focus and context of each question.
- Write answers of an appropriate length, being guided by the space provided in the answer booklet and the mark allocations of questions.
- Answer with precision and clarity, avoiding vague words or statements which should always be qualified or elaborated (e.g. pollution, overcrowding, resources, facilities).
- Develop ideas or link them to others when extended writing is required in those questions worth five or more marks.
- Interpret various types of source material, including graphs of different types, in order to support ideas. Accurate statistics (with units) should only be used if the question indicates that it is appropriate to do so.
- Interpret photographs, diagrams and maps carefully, referring to relevant evidence in them to support answers.
- Be able to describe differences (e.g. of features shown in photographs) or compare two features or time periods (e.g. of years shown on a line graph) by using comparative words.
- Learn geographical words and terms and use them correctly in answers and when writing definitions.
- Ensure that the answer is based entirely on the resource provided when the word 'only' is used in the question.
- Describe the distribution of a feature (e.g. settlements, deserts, earthquakes) on a map, referring where appropriate to scale, direction and other features.
- Have a wide range of case studies and choose them with care to fit the questions selected.
- Include relevant place-specific information in case studies, without including detail which is not relevant to the question set.
- If extra space is needed to answer a question, use the continuation pages at the end of the question and answer booklet. Ensure that any such answers are clearly labelled with the question numbers (e.g., **3(b)(ii)**) rather than page references.

General comments

The paper discriminated well with marks being distributed across the entire mark range. It was encouraging to see large numbers of candidates performing very well across the paper, showing good geographical knowledge and understanding throughout and handling the skills required with a high level of competence. Most candidates, whilst not performing so consistently across all questions, did make a sound attempt at many parts of their chosen questions. However, as always, a significant minority were less convincing, either in terms of correctly interpreting the questions or in producing detailed, accurate answers, thus enabling the paper to differentiate effectively between candidates of all abilities. Some candidates across the ability range did not score marks consistently as they did not respond correctly to all command words (e.g., 'describe' in **Q.1(a)(iv)** or 'explain' in **Q.3(b)(ii)**). Sometimes important words are **emboldened**, as was the case with 'and' in **Q.1(c)** and **Q.6(c)**. This is done to draw candidates' attention to a significant word which should not be overlooked. In both these cases, candidates were required to consider two different factors when answering these questions.

There were rubric errors from some candidates, who tended to only answer the earlier/easier parts of all six questions omitting any attempts at the later, higher scoring questions. In very few cases, candidates attempted to answer all parts of all six questions which often resulted in limited explanation in the parts worth more marks.

The presentation of answers from most candidates was acceptable, although the writing of a few candidates was barely legible in parts and care was not always taken to complete tasks with sufficient care. Candidates will not gain the marks they may deserve if their work cannot be read. Answers were usually in an appropriate amount of detail. Occasionally, answers worth only two or three marks were too long and/or answers to questions worth a higher number of marks were too brief. However, most candidates were guided by the space provided and the mark allocations. Some candidates made use of the lined pages at the end of the booklet; however, some needed to do so only because they had included too much irrelevant material in their answers, particularly in case studies. A few did not clearly indicate which questions they had answered on these lined pages.

Questions 1, 3 and **6** were the most popular questions. There were many good answers seen to all questions, including those requiring extended writing, particularly to the **part (c)** questions on the positive impacts of international migration, explaining why people live close to volcanoes, and also when describing and explaining the characteristics of hot desert vegetation. There is an increasing trend to include unnecessary detail in case study questions. This often consists of a general introduction with irrelevant information about the topic being tested (e.g. a description of traffic congestion when the question asks about its causes). Such superfluous detail is not helpful as it is sometimes included at the expense of relevant information and development. The best case study answers seen were from those candidates who wrote with a clear focus on the question, developing or linking ideas and including place-specific information. Weak responses were typically poorly focused with brief lists of simple points (sometimes in bullet points) not all of which were relevant.

The following comments on each individual question will highlight candidates' strengths and weaknesses and are intended to help centres prepare their candidates for future examinations.

Comments on specific questions

Question 1

This session, **Question 1** was even more popular than usual, with the vast majority of candidates choosing it.

(a) (i) The vast majority of candidates answered this question correctly; however, in a few cases candidates transposed birth rates and death rates.

(ii) Most candidates placed the countries in the correct rank order.

(iii) This question was often not well answered. Most candidates were able to identify that most countries are in Africa, with some noting the anomaly in the Middle East. Few, however, noted the uneven distribution or the fact that many of the countries are in the tropics.

(iv) This question was often well answered and differentiated well. Stronger candidates considered a range of different problems. Some candidates did not gain credit as they made more general statements such as lack of services or resources, or unspecified pollution. They need to ensure that they are more specific in their answers, for example, air pollution or breathing problems rather than 'pollution'.

(b) (i) This was a slightly different style of question and stronger answers explained very clearly how education can reduce birth rates in different ways. Most candidates stated the impact of education on the use of contraception, or that educated women tend to marry later. Some candidates, however, just wrote extensively about one idea rather than considering different factors.

(ii) This question differentiated well and there were some high scoring answers which considered with breadth and/or depth the reasons why access to good healthcare can impact death rates. Weaker responses considered factors such as sanitation or diet but did not link these clearly to good healthcare, for example, medical staff can advise people about these.

(c) This was a straightforward case study and differentiated well. The strongest candidates selected appropriate case studies such as Mexico to USA and the Philippines to Singapore, and considered in detail the positive impacts on both the origin and destination countries. A small number of candidates considered the problems caused rather than the benefits, or failed to consider both origin and destination countries.

Question 2

Few candidates chose to answer this question.

(a) (i) The majority of candidates correctly identified an area of open space.

(ii) Most candidates answered this question correctly.

(iii) Candidates needed to state three different features of the street layout, such as the grid pattern, the planned nature of the layout, and the different orientations of the streets in different areas of the map.

(iv) This question was not well answered. Whilst candidates identified that the hospital is on the edge of the CBD, few noted it was in the northern part or were able to suggest clear reasons for its location.

(b) (i) Most candidates correctly identified clear comparisons between the two areas in the photographs, particularly the height of buildings and the variation in number of pedestrians.

(ii) Many candidates did not answer this question well, and did not extend their ideas beyond the statements that CBDs have higher order services and are more accessible. It appeared that some of the candidates were not familiar with the term CBD.

(c) This question discriminated well. Stronger responses clearly explained the causes of traffic congestion in a named urban area, particularly in New York or London. However, many candidates did not extend their answers beyond simple Level 1 statements. Some answers considered irrelevant ideas such as what is being done to solve traffic congestion rather than explaining what causes it.

Question 3

This question was more popular than **Question 4**.

(a) (i) Most candidates used the map and key to state the correct magnitude of the earthquake.

(ii) Many candidates were able to use the map and key to correctly identify the countries from the descriptions. Where errors were made, it was usually when identifying the country with the earthquake which caused the highest number of deaths. Some candidates did not look at the key carefully and so stated Indonesia rather than the correct answer of Philippines.

(iii) Stronger candidates gave a very full description of the distribution of earthquakes shown on the map. Many candidates, however, simply stated that they are on plate boundaries or on the Pacific Ring of Fire, and failed to develop their answer further with ideas such as the linear and uneven or clustered nature of their distribution.

(iv) Stronger candidates showed a good understanding of the processes which occur at conservative plate boundaries; however, some candidates mistakenly described other plate boundaries and so failed to gain credit.

(b) (i) This was well answered by many candidates. However, some candidates described the impacts rather than identifying the hazards shown on the diagram.

(ii) Destructive plate margins were generally well understood, although some weaker responses incorrectly stated that the lighter plate moved downwards and there were frequent omissions of the need for magma to rise before erupting/escaping. A few others wrote about divergent margins, despite the evidence on **Fig. 3.2** that this was not the case.

(c) This question differentiated well, with some excellent answers clearly explaining why people live close to volcanoes. A range of case studies was used, from Mt Sinabung to more recent Icelandic eruptions or the eruption of Cumbre Vieja on the island of La Palma. Whilst less prepared candidates gave simple lists which achieved Level 1, many developed their ideas to achieve Level 2 answers, particularly when explaining factors such as fertile soils and tourism. However, many candidates failed to state specific place detail to gain full marks for this question.

Question 4

This question was less popular than **Question 3**.

(a) (i) Most candidates correctly identified the Sahara Desert.

(ii) Most candidates used the map well to describe two differences between the locations of the deserts. Candidates, however, need to avoid using ideas such as 'above or below the equator' and instead should state 'north and south of the equator'.

(iii) Many candidates failed to state three relevant ideas to describe the distribution of hot deserts using the map. Many could name three continents which have deserts; however, fewer candidates stated that they occur on the western side of continents. Some answers gave latitudes, but the range of latitudes stated was often incorrect. A frequent error was the idea that deserts are found near the equator.

(iv) This question was not well answered and demonstrated little understanding. Candidates needed to state ideas such as cold ocean currents flow offshore, and so the air is cooled causing condensation, which forms fog or rain before the air reaches the land. In terms of the impact of prevailing winds on the Atacama Desert, some candidates stated that the wind is dry. However, they needed to develop their answer more fully to include ideas such as the winds blow from the south-east, blowing over large areas of land, with rain falling before it reaches the desert, meaning the Atacama is in a rain shadow.

(b) (i) Whilst many candidates were able to use comparative language well to compare the clouds shown in the diagram, for example, the differing heights, some candidates failed to correctly compare the differing shape of the two cloud types.

(ii) There were some excellent answers which detailed a whole range of processes involved in the formation of convectional rainfall. Weaker answers, however, were less specific and mentioned only one or two ideas, such as evaporation and condensation.

(c) Most candidates were able to describe some characteristics of desert vegetation and many could explain one or more adaptations of desert plants to achieve Level 2 credit. Very few answers, however, included any place-specific detail to achieve Level 3. Some candidates wrote about adaptations of fauna rather than vegetation; a few others described climatic conditions. A common error was to refer to evaporation rather than transpiration.

Question 5

This was a popular question, but it was answered by a slightly smaller proportion of candidates than **Question 6**.

(a) (i) Most candidates answered this question correctly.

(ii) Many candidates correctly completed the pie graph. Some, however, drew the sector in the wrong order and so did not gain full marks.

(iii) Many candidates correctly identified three different changes in the employment structure, but others failed to identify the slight decrease in secondary industry.

(iv) This question discriminated well and good answers stated a clear narrative which described the provision of employment and gaining of skills, leading to securing a job and so earning more money, which leads to economic development.

(b) (i) Where candidates used comparative language to describe the evidence shown in the table, they often gained full marks.

(ii) This question discriminated well. Well prepared candidates referred to the fact that HDI is a 0 to 1 index whilst GNP is a currency, and often further developed their answers to include ideas such as that HDI is a composite indicator whilst GNP is just one measurement. Many candidates also showed an understanding of the different components of HDI; however, some wrongly referred to literacy rates and birth rates.

(c) This question discriminated well and there were some excellent responses. Many answers, however, were weaker and demonstrated less understanding of the process of globalisation. Candidates needed to develop their answers fully to gain Level 2 credit, for example, that countries need to trade and so have developed trade agreements or free trade, or that the rise of containerisation and/or air transport developments have allowed the transport of raw materials and also goods between countries, with the growth of TNCs arising from, and also creating, a global demand for products.

Question 6

This was a popular question with a slightly larger proportion of candidates choosing it than **Question 5**.

(a) (i) Most candidates answered this correctly using the graph.

(ii) Most candidates gained full marks by reading the data carefully. However, some candidates reversed the order of HEP and oil.

(iii) This question was usually well answered, using comparative language to describe the differences without the use of statistics.

(iv) This question was often not well answered, as candidates considered Australia as a whole rather than considering why the use of renewables varies between states. Some candidates, however, correctly suggested ideas such as the use of HEP would vary as some states lack high rainfall or fast flowing rivers, or that some states might lack fossil fuels and so would use more renewable energy.

(b) (i) This question was a good discriminator. Well prepared candidates described the overall pattern well, with ideas such as the pattern is uneven, that crude oil production is spread across the country and is found both inland and on the coast, with specific locations identified from the map, such as on the west coast and also in Central Australia.

(ii) Good understanding was demonstrated, such as the need to avoid dependence on finite sources and on imports. Responses discussed the need to reduce carbon dioxide emissions and so reduce global warming, together with other impacts such as acid rain and air pollution.

(c) This was a straightforward case study and differentiated well. A range of examples were used such as Nissan (Sunderland), Toyota (Burnaston, near Derby) and Pakistan Steel Mills (Pipri, near Karachi) as well as answers more local to the candidate. Where candidates chose an appropriate area or zone rather than a whole country, e.g., Shenzen rather than China, they could often give a range of developed ideas about how that region met the locational requirements of manufacturing industries and incorporated valid place detail. Many weaker responses knew what the factors of location were but could not link them to a specific location.

GEOGRAPHY

Paper 0460/21
Geographical Skills

Key messages

- Paper 21 is a skills paper and candidates are required to interpret various styles of graph. It is crucial that candidates understand how to read and interpret triangular graphs, flood hydrographs and climate graphs. Candidates should pay attention to what is being shown and axes labels. If a question asks for the use of data, it should be quoted accurately.
- Many candidates answered this paper at length. This effort, however, was often misdirected with many not identifying the command words in the question stems and therefore not writing what was required. If a question asks for a comparison, then it is important that comparative language is used. Likewise, if a question asks for the global distribution or the main features, then the whole resource should be examined and trends should be highlighted.
- Candidates should have a thorough understanding of geographical terminology and be able to use this in their answers. Some candidates did not gain marks as they lacked the ability to express themselves clearly.
- This paper has identified some areas of the syllabus which are not well understood by candidates, particularly urban land use models, drainage basins and sustainable tourism.

General comments

The majority of questions in the paper were attempted, with the least attempted question being the triangular graph. Candidates generally scored better marks on the short answer questions, with extended responses proving more differentiating.

Comments on specific questions

Question 1

(a) Candidates scored well on this section with clear interpretation of the map and its key. Feature **A** was the '*A735/A road/main road*' (not the A30 as some candidates identified) and **B** was a '*place of worship/church with tower*'. There were several possible responses to **C**, '*non-coniferous trees/coppice/scrub/plantation*' (orchard, bracken, heath and rough grassland were not creditable). Feature **D** was a '*mast*' and the height above sea level of the spot height at **E** was '*80m*'.

(b) The response to the distance along the railway line in **part (i)** was mostly good with the correct answer within the range of 3.5 – 3.7 km. Where an incorrect response was given, it was usually because the scale had not been calculated properly, so distances were in the hundreds or thousands of kilometres. The bearing in **part (ii)** was often calculated correctly at 144° – 147°; where it was incorrect, it was not close to the correct answer. Candidates did not identify the grid reference (426382/427382) well in **part (iii)**, with most getting at least figures 3 and 6 incorrect. It is important to note the instructions on how to read grid references in the syllabus.

(c) This question related to the locational factors of a golf course shown in the map extract. **Part (i)** was multiple choice with three answers related to the direction of the slope and three answers related to the land use. Two answers needed selecting, which the majority of candidates did. The correct two answers were '*south-east-facing slope*' and '*rural-urban fringe*', with the latter selected more often. Some candidates selected two responses regarding the direction of the slope, or two responses related to the land use, which meant a maximum mark of 1. **Part (ii)** asked for map evidence for the location of the golf course. The most common responses were '*near to roads*' and '*space*' followed by '*gently sloping relief*' (not flat). Few identified that the land in the '*rural-urban is cheaper*' or that the location is '*lowland*'. Although many identified that the golf course was '*close to settlement*', they either did not explain why this was important ('*customers/market/supplies*') or stated that it would be quieter, which was not creditable.

(d) Very few candidates gained the full 7 marks for this question. There was a lack of understanding of what is meant by human features and if answers were given, then they tended to only be '*bridges*' and sometimes '*paths*'. Many thought '*weirs*' were a place rather than a feature and few noticed the '*cuttings/embankments/levees*'. Whilst there was much better identification of the physical features, there were still some who scored 0, listing the surrounding land use rather than the features of the river itself. '*Meanders*' and '*tributaries*' were the most popular answers (although too many candidates do not understand that a tributary feeds the main river). Most thought the flow was south-west rather than '*west/west-south-west*' and few identified that there were '*more meanders in the east/south-east*'. There were not many responses related to the width of the river.

Question 2

(a) Understanding of triangular graphs has historically been poor. This paper showed that there has been some improvement, although less than half of candidates are getting the associated questions correct. The percentage of Germany's population aged 0–14 years was 15 per cent. Where candidates were incorrect, they generally answered 25 per cent, reading the graph vertically rather than at the angle shown by the axes.

(b) Some candidates plotted the world's population structure correctly in **part (i)** but the majority did not, placing their answer in various parts of the triangular graph. This was also the question with the highest omission rate. It is imperative that, when plotting a graph, the points drawn are small and neat. Some of the dots were 3–4 mm in diameter which meant it was impossible for them to be accurate. Most recognised another type of graph that could be used to plot this data in **part (ii)** as a '*population pyramid/bar graph/pie chart*'. A few answered '*line graph*' and occasionally '*scatter graph*' which could not be used to represent this data; '*pyramid*' alone was not accepted. There was a good success rate for **part (iii)** with '*Germany is lower*', although if candidates incorrectly answered **part (i)** with 25 per cent, then they were likely to also get this question wrong by stating that the percentages were the same.

(c) This question was usually done well, with many candidates having knowledge of the problems caused by an ageing population. Common correct answers were '*less economically active*', '*pressure on health services*' and '*lower birth rate*'. Stronger candidates also referenced '*fewer taxpayers'* and '*more money needed for pensions*'. The least common answers were that an '*increased proportion were not contributing to the economy*', '*difficult to defend the country*', '*immigration to fill jobs*' and '*need more nursing homes*'. Weaker responses stated '*more deaths*', but this was not credited.

Question 3

(a) For **part (i)**, candidates were required to study the three images in the insert and identify each land use zone from the options provided. **Fig. 3.1** was the '*CBD*', **Fig. 3.2** was the '*rural-urban fringe*' and **Fig. 3.3** was '*residential*'. Most correctly answered '*residential*' but there was some confusion that **Fig. 3.1** was industrial, and **Fig. 3.2** was also residential. A small proportion of candidates used all five available options which meant they could not gain full marks. For **part (ii)**, the majority gained a mark, although responses were often very poorly worded and needed interpretation. The clearest answers were based on it being '*cheaper to build upwards*' and it '*saves space*'. Where candidates did not achieve the mark, it was almost entirely because they talked about flooding.

(b) This question was often misunderstood, and candidates struggled to clearly express their answers. Candidates were asked to compare the MEDC and LEDC urban land use models. A high proportion focused on the intricacies of the diagrams rather than their use as models, drawing attention to the size of each land use zone and even the colours used. This gained no marks. Others described each model individually and used no comparative language. The strongest answers stated that the '*CBD is in the centre in both*' and that the '*MEDC has rings and the LEDC has (rings and) wedges*'. The term wedges was rarely used; synonyms were accepted, but the clarity of language was poor. Candidates then needed to make direct comparisons of the models, for example, '*high class residential on the outskirts in the MEDC and surrounding the CBD/in a wedge in the LEDC*'. It is important that in questions such as this, candidates write clearly and concisely and that trends are highlighted.

Question 4

(a) In this question, candidates had to match definitions to key geographical terminology related to rivers and drainage basins. The majority defined evaporation correctly ('*when liquid turns into gas*') but watershed and tributary were less well known.

(b) This proved to be a challenging question and there was a lack of knowledge and understanding around drainage basins and particularly flood hydrographs. Whilst some candidates recognised in **part (i)** that the x-axis represented time and the y-axis represented discharge, they were unable to use the correct terminology (lag time, rising limb, falling limb, peak discharge) to answer the question. Candidates who scored more highly separated the flood hydrograph into distinct sections to compare, such as '*A starts at a lower level*', '*A rises more quickly*', '*A has a higher peak discharge*', '*A falls more quickly*', and '*A drops to a lower level*'. References to more/less discharge were not credited as they were too vague. In **part (ii)**, very few candidates gained 3 marks and many did not gain any marks as they did not recognise what the question was asking them to do. Answers needed to refer to how the drainage basins differed in terms of their vegetation, gradient, tributaries, permeability, urbanisation and shape. If candidates referenced the size of the basin (as they often did), they needed to link this to the peak discharge or lag time (which they did not). For example, '*A is a larger basin as it has a higher peak discharge*' or '*A is a smaller basin as it has a shorter lag time*'.

Question 5

(a) Candidates mostly did well on this question which related to the global distribution of tropical rainforests. The best answers began with a statement such as '*along the equator*' or '*between the Tropics*' (not near the Tropics). Candidates then needed to name specific regions and continents including '*South America*', '*central America*', '*central Africa*', '*south or southeast Asia*'. It should be noted that there is no credit for stating where tropical rainforests are not found, which many candidates did.

(b) **Part (i)** was almost completely correct at 250 mm, but **part (ii)** did prove a little more challenging in terms of accuracy. A range of 26.5° – 27° was accepted.

(c) Many candidates failed to describe the main features of the equatorial climate as requested in the question stem. Rather than highlighting the trends, they talked about individual months throughout the year, sometimes quoting figures. Where figures were given, they were often inaccurate either due to carelessly reading the graph or using generic learnt data. Better answers achieved 3 marks with '*high temperatures*', '*low temperature range*' and '*high rainfall*'. Other possible answers were '*rainfall all year*', '*less rainfall June–October/November*', '*no seasons*', and calculations of the ranges.

Question 6

(a) Most candidates gained all three marks on this section, with credit being given for either '*north*' or '*north-west*' in **part (i)** and for '*hills/mountains*', '*caving*', '*beaches/bays*' and '*safaris*' in **part (ii)**. Where full marks were not achieved it was usually because '*hills*' and '*mountains*' were separated out for **part (ii)** and no alternative was offered.

(b) This question was also well answered with candidates having knowledge of the benefits of tourism that they could readily draw upon. Most gained 2 marks for a combination of '*jobs*', '*income*' or '*cultural exchange*', although it should be noted that the question asked for the benefits for local residents, therefore improving the economy was not credited. Alternative answers were '*preserve traditions*', '*developing a named infrastructure*' (not infrastructure alone) and '*more facilities for locals*'.

(c) Few candidates gained full marks on this question despite writing at length. For many, there was a lack of understanding of what sustainable tourism means, and responses focused on building more hotels, airports, bars and restaurants. For others, they did grasp the concept of sustainability, but descriptions were vague, such as fines and advertising. It was important that ideas were based on what the Jamaican government could do rather than companies or individuals. The strongest answers linked all three parts of the question together: sustainability, tourism and the government. Responses such as '*limiting tourist numbers*', '*controls on tourist developments*' and '*national*

parks' were generally well expressed when they occurred. Few candidates talked about '*grants for eco-tourist developments*', '*locals providing accommodation*' and '*limiting water use*'.

GEOGRAPHY

Paper 0460/22
Geographical Skills

Key messages

- Candidates should not read the key in isolation from the map itself in **Question 1**. In **part (e)**, for example, several candidates suggested that the railway line avoided steeper slopes by creating cuttings, tunnels and embankments, but in fact no tunnel existed on the map. Similarly, in **Question 1(c)** no museum was found on the map, even though it appeared in the key.
- Many candidates showed in **Question 1** that they needed more practice on grid references, distance calculations, compass bearing, and identifying features on and completing a cross section.
- It is important to read questions carefully. For example, **Question 6(b)** referred to the role of the government in increasing agricultural output. Many candidates seemed to ignore this and wrote about how farmers could do this.
- Candidates should study the command words in each question carefully. For example, in **Questions 3(a)** and **6(a)** many candidates attempted to explain the location of the features they had identified in **Figs. 3.1** and **6.1**, but the question only asks for their description – in other words, state what you can see.
- Candidates should be able to use correct language and terminology when making comparisons.
- Candidates should practise their understanding of key geographical terms to avoid misunderstanding the question, for example, physical (natural) features in **Question 1(d)(ii)**.
- When candidates run out of space, they should be encouraged to write on the extra pages rather than use complex footnotes elsewhere on the page which are linked by arrows. In addition, when writing on the extra pages, they should make sure the question part is clearly stated.

General comments

Overall, the paper was answered well, a wide range of marks was attained, and very good responses were seen for all questions. The stronger candidates were given the opportunity to demonstrate their ability and made good use of geographical terminology. The weaker responses showed some geographical knowledge and understanding. The ability to successfully interpret maps, graphs and photographs and provide appropriate responses was displayed. Generally, candidates performed equally well across all the questions, with **Question 5** being done particularly well and **Questions 3(b) and 6(b)** less so. There was little evidence that candidates ran out of time to finish the paper with few question parts not attempted. In general, good use was made of English grammar and sentence structure to convey geographical ideas. Most candidates made good use of the space available for their answers and only used the additional pages when some or all of an answer had been crossed out.

Comments on specific questions

Question 1

(a) Candidates generally scored well on this section, demonstrating an ability to find features on the map and identify them using the key. The type of road at **A** was a secondary or B road, and the feature at **B** was a place of worship with either a spire, minaret or dome. Some candidates left out the building type here and stated 'with spire', etc. The feature at **C** was a mast, and the height above sea level of the contour at **D** was 85m. Some mistakenly gave the spot height of Tarbert Hill at 138m nearby. The land use at **E** was non-coniferous trees, forest or woodland. The section of the key 'Vegetation' where this feature is found was not credited.

(b) Although there were many correct answers, some candidates found **part (b)** challenging. The grid reference in **(i)** was 208484, and the distance in **(ii)** was 2.5 km. Some minor tolerance was allowed

for both responses, for example, in **part (b)** responses between 2.4 and 2.6 kilometres were credited. A wide variety of answers were given by candidates in the latter, with some being out by a factor of ten or more.

(c) The cross-section question proved difficult for many candidates, with a significant number omitting **part (iii)**. In view of the clustered nature of some features at **X** on the cross-section, a number of different answers were credited. These were more precisely Carlung Farm or, more generally, building(s). Other candidates suggested one or more of an 'other road', 'drive' or track' which was allowed. Carlung House or Croek Hill were common errors here. Feature **Y** was clearly a main or A road**.** Some stated more precisely that it was the A78, although a few candidates incorrectly copied the exemplar from the map key, the A30. When completing the cross-section in **part (iii)**, there should have been a very steep western side to the hill. Owing to the clustering of the contours in this area which made the observation of the exact height difficult, a tolerance was allowed between 55 and 64m. Although many correct responses were seen, a large number peaked at approximately 40m.

(d) (i) This question was well answered with almost all candidates correctly identifying at least three tourist attractions along the coastline. Of these, the castle, pier, picnic site, coastal path (recreational route), hotel, golf course and beach were most commonly stated. Although frequently mentioned, the car park was not considered as a tourist attraction and whilst a museum appeared in the map key under 'Tourist and Leisure Information', one did not exist on the map and thus could not be credited.

(ii) When describing the physical features of the coastline, only those to the west of the coastal path were considered. There were plenty to choose from and candidates who were familiar with coastal landforms had few problems. Headlands and bays were commonly mentioned together with cliffs and islands or stacks. The presence of beaches or sand and shingle was often noted, as were loose rocks or rock outcrops.

(e) Those candidates who understood the concept of relief tended to score at least two of the three marks available. The best responses differentiated between height and gradient, making separate points on each, using evidence from the map. For instance, 'The railway line curves around Tarbert Hill' and 'The railway avoids the steeper slopes'. There was some repetition of points using different features. The use of cuttings and embankments was recognised by some candidates whilst others just copied the key and referred to tunnels which do not exist. Some candidates mistook the scale of the landscape, referring to mountains and mountainous rather than hills or hilly. Very few noted that the railway line follows the coastline to the south of the map.

Question 2

(a) (i) The majority of candidates gave a correct response of either 27.5 per cent or 28 per cent from **Fig. 2.1**. 27 per cent was also frequently seen but it was felt that this was not accurate enough. Although not expected, some candidates had clearly used a protractor and measured the angle for China's carbon emissions at 100° and divided this by 3.6 to get an answer of 27.8 per cent.

(ii) In most cases, **Fig. 2.1** was successfully completed with an angle of 139° to 142° drawn for the rest of the world. Examiners pointed out, however, that the shading was often untidy. Candidates should note that they are permitted to take a ruler into the examination to use on such occasions.

(b) The best responses used terms such as least/most/greatest to compare trends in the annual carbon emissions shown on **Fig. 2.2** between China, USA and India. These often started off noting that all three countries increased over the whole time period, and then said China had the most increase, India the least/is the lowest and/or China overtook USA as having the highest emissions. Few noted that USA fluctuated the most or that, whilst China and the USA fell toward the end of the time period, India continued to increase.

Weaker responses tended to give comparisons of single years or periods of several years, or descriptions of each country's trends without making any comparative points.

(c) This was generally answered well, with the ideas that LEDC's had fewer cars and fewer factories than MEDC's. The latter was often aligned with less use of machinery. Less frequently, some candidates suggested that LEDC residents were less able to afford household appliances or

technological goods such as computers as well as taking fewer flights. Those who suggested that LEDC's used less electricity needed to state what this energy was used for.

Question 3

(a) Candidates engaged well with this question, examining **Fig. 3.1**, a river port in Germany (Dortmund), very carefully. Although some answers were unnecessarily lengthy, many scored the full 5 marks. Most commonly candidates referred to the space occupied by containers, as well as for warehouses, factories and a few houses or offices. Others noted the roads and the bridges as well as the areas of parked vehicles. However, it was evident that many candidates did not know a suitable term for a wharf/dock or berth for ships. In addition, the term 'storage' was often stated but needed to be qualified. Some did identify the cranes and many noted the trees that were adjacent to the main road. Many candidates described the activities of such a river port or how industries used it, for instance, terms such as exporting, importing, and transporting cargo did not answer the question. Weaker responses also described the way the water was used rather than the land. The port itself was outlined in yellow, so some candidates named features that fell outside this boundary, such as forest and residential areas.

(b) This question required candidates to pick out a factor and then give a brief reason why it was good for manufacturing industry. Thus, the most common creditworthy points were: the presence of a road or river used for moving goods, nearby housing for a labour supply or market, the provision of flat land which is easier to build on, and that it was a large area which could be used for expansion or for large buildings.

Many candidates, however, did not pick out the feature which made it a good place for manufacturing, especially the roads and river. In the latter case 'river port', taken from the question stem, was often used instead. Generic statements were also common, for instance, 'The water can be used for power generation' and 'Ships can be used for transport'. In addition, reference to the trees outside the port to reduce air pollution was not credited.

Question 4

(a) Most candidates scored well on **Questions 4(i), (ii)** and **(iii)**, showing an ability to extract information from a climate graph (**Fig. 4.1**). August was the month with the lowest rainfall, and September and October the months with the highest temperature. The total annual rainfall was estimated at 3000 mm. A minority of candidates mistook the line for rainfall and the bars for temperature.

(b) This question discriminated well with the full range of marks being credited. Few candidates specifically noted the extent that it was true by stating that it is true for temperature, but not true for rainfall; some responses were indecisive using terms such as 'mostly' and 'partially' which did not gain credit. Many recognised the small range of variation in temperature and stated that the temperature range was from 26 °C to 28 °C or that there was a difference of 2°C. On the other hand, it was often recognised that there was a distinct fall in rainfall from June to November and that there was a large variation in the rainfall. Some candidates correctly worked out the range of rainfall as 282 mm, but more common was the range 114 mm to 396 mm. Some candidates used the names of seasons, for example, summer, but these did not correspond to major trends. There was also a tendency for weaker responses to list months as rising and falling, with more general trends absent. Some also tried to unsuccessfully link temperature changes with rainfall rising and falling. Again, those who mistook the line for rainfall and the bars for temperatures inevitably drew incorrect conclusions on seasonality and provided statistics which were inaccurate.

(c) The reasons for high rainfall in equatorial regions were well understood by the majority. There was frequent reference to low pressure as well as high levels of humidity, evaporation and transpiration. Many knew the processes of convectional rainfall formation, even if the term was not used. Weaker responses seldom went beyond stating that there was a lot of tropical forest or that temperatures were high.

Question 5

(a) The majority correctly stated that HDI stood for Human Development Index**.**

(b) Almost all candidates selected the Netherlands as the most developed country based on the data in **Table 5.1**. Furthermore, the majority gained all four marks by stating that the Netherlands possessed the highest life expectancy at birth, the longest years of schooling and the highest GNI per capita. Some achieved the same result by stating that these indicators were higher than Madagascar and the United Arab Emirates.

(c) This topic was well known with many candidates writing at length on a variety of factors to suggest why life expectancy in an LEDC is lower than in an MEDC. The lack of healthcare and appropriate medicine was seen the most, together with the suggestion that in addition, these could not be afforded by most of the population. Lack of trained nurses and doctors was also a common response. Another thread was the lack of sanitation together with a clean water supply, which can lead to the spread of diseases. A lack of education about hygiene and the spread of diseases were also commonly mentioned. Poor living conditions or standard of living were judged as being too vague as was the lack of education unless qualified as above.

Question 6

(a) The description of how land was being used in **Fig. 6.1**, a photograph taken in Bali, Indonesia, was generally well done, with the majority gaining at least two marks and many scoring four or five. The identification of features was key and those who were able to state what they saw achieved this. Arable or crop farming was commonly stated with many recognising flooded rice paddies. Beyond these, many referred to grassland, bushes or palm trees with forest in the background. Some noted that the land was terraced while others suggested the land in the foreground was sub-divided into rectangular plots. Few said that bunds or mud banks were present. The individual buildings were identified as houses or, more rarely, as being for storage, but these could not be described as a residential area as some suggested.

(b) Although a range of suggestions were made, candidates in general lacked knowledge on the ways governments could help increase agricultural output. Many candidates failed to acknowledge the ‘government’ aspect at all, and described activities that farmers could undertake instead. Others wrote as if governments provided or supplied a number of different inputs such as fertilizers and machinery. There was, however, reference to loans and subsidies but suggestions about what these were for were often omitted. Some did refer to reducing taxation and the reduction of imports of similar crops. Restrictions to prevent development on farming land were occasionally referred to. Provision of named infrastructure such as dams for irrigation or roads for transport of crops was credited. Finally, research, for example, into HYV or GM crops, and education or training on named aspects of farming were also seen.

GEOGRAPHY

Paper 0460/23
Geographical Skills

Key messages

- Candidates need to understand the difference between tributaries and distributaries. They need to know that tributaries bring additional water into a main river as they join with and flow into it.
- Candidates should study the map key carefully, particularly when multiple symbols are assigned to the same line. They need to be able to pick out the correct wording to describe a particular symbol and not copy out all of the wording.
- Candidates should practise describing photos so that they only state what they can see, rather than making judgements.
- Candidates should use any remaining time to thoroughly check through their work, even the most straightforward sections of the paper, where a simple error is easily made and can be easily corrected.

General comments

This paper contained some interesting questions, to which candidates responded well. They were able to show their appreciation and understanding of topical issues and they often used examples to helpfully illustrate their points, even though this was not required by the question.

Overall, no one question stood out as being particularly easy or particularly difficult. **Question 1** had lots of straightforward sections, but the grid reference in **Question 1(b)** caused a few problems and **Question 1(e)** was a good differentiator. **Question 2**, with its two pieces of extended writing, was very accessible, due to the photographic resource and the need for five points. **Question 2(a)** stretched candidates' skills of observation and description. **Question 3** seemed to be a little unfamiliar to some, but they were able to use the resources, and perhaps had practised a similar question on earthquakes, which would have helped with **Question 3(b)(ii)**. **Question 4** looked straightforward but differentiated well since weaker responses were predominantly copied from the source material. In **Question 5**, particularly **Question 5(b)(ii)**, candidates often showed excellent understanding and some carefully reasoned ideas. This also applied to **Question 6**, particularly **Question 6(c)**.

Candidates appeared to have ample time to complete the paper, and many seemed to have gone back and added additional comments to **Question 5(b)(ii)**, as well as writing at length for **Question 6(c)**.

Comments on specific questions

Question 1

(a) The 1:25 000 map was for Cunninghame, Scotland. Candidates were directed to the south-west corner to identify various features. These were positioned and labelled on **Fig. 1.1**. Thus, candidates had to match **Fig. 1.1** with the corner of the map extract and then use the key.

The type of road at **A** was '*road generally less than 4 m wide*', as detailed in the key. Given the subtlety of colour difference between that and '*road generally more than 4 m wide*', many candidates answered correctly.

Feature **B** was an abbreviation. The letters were shown on **Fig. 1.1**, with FB representing footbridge. It is always good practice to refer to the map, rather than going straight to the key, though this led some candidates to look around the general area of the footbridge and write other answers such as cemetery or waterfall.

Area **C** was a rather convoluted shape and candidates were asked to identify the land use. The shape encompassed the green shading on the map, within which were the symbols for both coniferous trees and non-coniferous trees. Candidates needed to use the key to identify at least one of these types of trees, rather than just writing woodland or forest. Many had a comprehensive answer giving all the details. A few did go too far, and included other types of vegetation shown on the key that were not present at this location on the map. A few just wrote vegetation, which was not enough information. A few wrote '*Noddsdale'*, the name at this location, but this is clearly not a land use.

The spot height at **D** was 288 metres above sea level. Most candidates had the correct answer. Some had put 228, which could have been spotted and corrected if any remaining time had been used to check work.

Settlement **E** was Middleton. Again, many had the correct answer, but this was the least well done of the **part (a)** questions. Many were influenced by the shape used to show **E** and thought less about its placement. They forgot that they were looking for a settlement and instead opted for Middleton Reservoir.

The river at **F** was Whitlie Burn. This proved to be the most straightforward of the six questions in **part (a)**, with just a small number forgetting to look for a name and instead writing waterfalls.

(b) **Fig. 1.1** was used again in **part (b)** to show the location of the settlement of Craigton (**G**). Candidates were asked to give the six-figure grid reference for the settlement, and it was possible, though not best practice, to get the correct answer of 218 626 by measuring directly from **Fig. 1.1**. The alternative of 218 625 was also accepted. Many made mistakes with the third or sixth figure. They were often only slightly out, showing the importance of measuring with a ruler rather than just guessing. Some did get the digits in the wrong order, particularly swapping the eastings with the northings. There was a relatively high omission rate on this question.

(c) For **part (c)**, candidates could look at the entire map extract and they were asked to identify two tourist facilities shown. The tourist information section of the key shows the symbols are largely bright blue, so are easy to spot. The Cunninghame extract had parking, fishing and a picnic site. Recreational route, taken from the Public Access symbols, was also acceptable, with a small section of a route in the south-west corner of the map. Many candidates had two correct answers, usually taken from the blue symbols. A few, however, had selected from the blue symbols without first considering whether the features were shown on this particular map extract. A few wrote about features that the tourists would find interesting, such as the waterfalls, but the question was asking for facilities.

(d) Candidates were now directed to a 4-square area on the eastern side of the extract, as identified by **Fig.1.2**. Rather than being asked to describe the area themselves, candidates were given ten statements from which they had to select the best four. The correct responses were '*there are no settlements*', '*highest point is 489 metres above sea level*', '*gradients are steep*' and '*no rivers flow above 475 metres above sea level*'. Most scored 3 or 4 marks on this task. A few did not follow the instruction to tick four boxes.

(e) **Part (e)** was a good differentiator, with only the most able candidates making seven valid points. However, the question was accessible for all and very few omitted it entirely, with most filling the space available and scoring a few points. The river was flowing south-west, down a steep or varying gradient, and many of the usual comments about rivers were valid, with varying width, meanders, and the arrival of tributaries, particularly on the western side. A few candidates did mention tributaries but did not get the mark, as they suggested that they were flowing away from the main river. Some candidates did appear to be writing about a generic river, as they were mentioning things such as erosion which could not be seen on the map.

There was at least one mark reserved for comment about the valley and many wrote extensively about this. They commented on the V-shape and the steep sides, producing a deep valley. Many also noticed the difference in the gradient from one side to the other, with the eastern slopes being steeper. The question was asking for natural features, so vegetation was also relevant. Many mentioned the trees and gave the types as in **part(a)(iii)**, though this detail was not necessary here. A few also picked out the bracken, heath or rough grassland for a second mark on vegetation in the valley. Comments about the road and settlements did not score. The highest scoring answers were often the most concise.

Question 2

(a) **Question 2** referred to the photograph, **Fig. 2.1**, in the Insert and candidates were asked to describe the housing shown in the image. The single-storey dwellings were built very close together and were constructed mainly of wood. Many candidates noted the use of tyres to provide a flat base against the slope and metal had also been used, usually on the low-pitched roofs. Comment could also be made about the balcony or porch, the windows, the satellite dish, and the power lines. This question was another good differentiator, with many candidates getting side-tracked into judgement comments rather than simply describing what they could see. Some also just described the area in general, being particularly drawn by the steepness of the slope, leading them into comments on disadvantages, such as lack of garden.

(b) **Part (b)** then did deal with problems, and candidates who found themselves writing a similar answer to that for **part (a)** should have reconsidered their previous response. Many realised that the precarious constructions could be unstable and would be vulnerable to collapse, and the idea of the land sliding away was itself a separate mark. Many also considered accessibility, that it could only be on foot and that the elderly or young children might experience particular difficulty. However, comments about vehicle access were based on conjecture, beyond the limit of the photo. Other possibilities were soil erosion, making it difficult to grow crops, which was mentioned by a few, and also the dangerously low electricity wires. Some just wrote generic comments that might be applicable to informal housing, but the question was seeking evidence from **Fig. 2.1**, so comments needed to be based on what could be seen in the photograph.

Question 3

(a)(i) **Question 3** contained both the hardest and the easiest parts of the paper. **Part (a)(i)** was found to be difficult by candidates, with many using **Fig. 3.1** to describe the location of tropical storms rather than the physical conditions necessary for their formation. They noted that the locations were near the equator but did not translate this into indicating hot, tropical temperatures. Others mentioned water, but as a significant amount is required, they needed to mention the ocean or sea. Near the ocean or near the coast was also too vague. Successful answers on this question may well have come from knowledge, with some getting the mark for high humidity, which was less obvious from the diagram. Some simply described the weather conditions experienced in a tropical storm.

(ii) Candidates were asked the name of the tropical storms affecting southeast Asia, north of the equator. There was a surprisingly high omission rate on this question, and candidates perhaps did not realise that all the information was available on **Fig 3.1**. By far the majority that provided an answer had the correct answer of '*typhoons'*. A small minority opted for cyclones due to confusion over compass directions. They were either looking south of the equator or at south-west Asia.

(iii) Further compass direction confusion was evident for some candidates in **part (iii)**. They were asked the direction of movement of hurricanes affecting the east coast of North America. The map showed diverging arrows, with two possible overall directions – north-west or north-east. Some simply wrote one of these, while others explained in detail. Others simply wrote east to west because they were not looking at the point of intersection with the coastline.

(b)(i) **Fig. 3.2** showed the number of people killed by weather hazards over 38 years and there were two clear peaks. Candidates had to identify the year in which there were the most deaths, which was '*199'*, and most candidates were able to do this successfully.

(ii) Candidates then had to consider why the number of deaths would vary from year to year. Many realised that the number and scale of events would vary. They also suggested that the affected population would vary, but they needed the idea of population density rather than just a vague comment about number over an unknown area. Others wrote about how the area affected would vary in terms of its preparedness, level of development or ability to forecast. These sorts of ideas were not always expressed very well, as candidates often implied that they varied with time rather than from place to place. However, the marks were still awarded. A similar question has been asked in recent years in relation to earthquakes, and candidates may well have used this as a practice paper. However, they did need to adapt their answer to address weather hazards. Unfortunately, a few wrote about earthquakes. This question was another good differentiator, with the more able producing clear and detailed ideas and some even referring to examples.

Question 4

(a)(i) This was the question with the highest omission rate on the paper, which is rather strange since **Question 1(e)** had shown that most candidates had some understanding of the term tributary. They had perhaps studied both **Fig. 4.1** and **Fig. 4.2** before reading the question and had been distracted by the written information. However, the answer, the '*River Tone'*, was to be found on the map. Some thought Bridgwater was a tributary, even though the town symbol was given in the key, and others opted for the Bristol Channel, but the majority who answered the question gave the correct answer.

(ii) Candidates then had to use **Fig. 4.2** to identify four physical features that led to flooding of the Somerset Levels. This type of question often draws candidates to copy out large amounts of text from the resource, but those who took that approach here did not score all the marks. They most commonly mentioned the low-lying land, but they also needed to pick out the wet January, the high tides and the silt-clogged river, which were mentioned in the discussion of the solutions to prevent recurrence. Those who did mention silt did not always locate it in the river and weaker responses thought the sewage was relevant.

(b) Candidates were then asked to suggest three reasons why local residents might be against the building of the tidal barrier. Popular ideas here included the expense, the visual pollution and the noise created during construction. Many expressed concerns about wildlife and habitats or ecosystems, though they did need to say something specific rather than simply '*it destroys nature*' or '*it harms the environment*'. Some seemed to be envisaging something more akin to a dam, since they wrote about people needing to leave their homes and land, forgetting that the landscape was prone to flooding in the first place. Other common ideas that were not credited due to the saline nature of the water involved included taking a water supply from the river and hindrance of silt deposition onto the farmland.

Question 5

(a) **Fig. 5.1** was a scattergraph showing life expectancy at birth and food supply per person, and candidates were asked to describe the relationship. The plots were in a wide band but, on the whole, candidates did decide that there was a positive relationship, with life expectancy increasing as food supply increased. Some commented on the spread of the data and picked out particular anomalous results, notably Japan or Lesotho. Most candidates had the right idea, but many only scored one mark as they only stated the basic relationship without any further description. They should be reminded to use the available marks as a guide as to how much to write.

(i) Candidates then had to suggest two natural causes of food shortages. Flooding and drought were the most commonly used correct answers, but some, perhaps inspired by **Question 3**, mentioned tropical storms. Pests or diseases and volcanic eruption were also possibilities. Common comments that did not score were vague responses such as '*too wet'* or '*too dry'*, long-term conditions such as '*infertile land'*, or '*earthquake*', where food shortages would largely be due to distribution issues, not the physical destruction of the food.

(ii) Although a challenging question which required candidates to articulate an explanatory response, many did well. Almost every candidate had at least one valid point and most had at least two, as they had considered both economic and political factors. For the latter, most discussed the effect of war, both directly on the land, on the farmers and on the distribution network, but also indirectly via trading restrictions. A number mentioned Ukraine as an example. Economic ideas often related to the inability to afford food due to poverty or inflation, or at a national level, with the cost of imports.

Others mentioned lack of investment in agriculture, as well as focus on cash crops, loss of farmland to urbanisation and political corruption diverting resources. The best responses were concise answers with four clear points. Some got side-tracked into environmental or population factors. Some filled the space with just two explained ideas and did not extend their answer to the additional space. Again, candidates should be reminded to use the marks available as a guide.

Question 6

(a) **Fig. 6.1** was a photograph taken in the Caribbean and candidates had to describe three physical attractions that they could see. They had plenty of space in which to respond and most did indeed provide some descriptive words, with some coming up with a whole string of adjectives for the sea, the sky and the vegetation. Beach was accepted on its own, but everything else needed a word combination, such as '*clean sea'*, '*blue sky'* and '*palm trees'*. Descriptive words needed to be meaningful. '*Beautiful'* or '*nice'* are subjective and too vague.

(b)(i) The pie chart in **Fig. 6.2** was complete and candidates needed to use it to state the percentage of carbon dioxide emissions produced by agriculture. Many had probably done this by eye, coming up with the answer of 8 per cent, which was valid. Some had measured 29° leading them to 8.1 per cent. Some had measured with less accuracy, coming up with 8.3 per cent (from 30°) which did not score.

(ii) Candidates were then asked to suggest another type of graph which could show the same information. There were a number of omissions on this question, but those who wrote something usually had a valid answer, typically '*bar graph'*.

(c) Finally, candidates were asked to suggest ways to reduce carbon emissions produced by transport and agriculture, particularly in relation to tourism. There were three marks, with one reserved for each section. Most candidates gave two transport ideas, finding agriculture rather more difficult. For transport they usually wrote about developing public transport, promoting walking and cycling, and encouraging electric vehicles. Other ideas were animal power and restrictions on either vehicles or visitors. Candidates seemed to find the agriculture answers less obvious, and they came up with some strange suggestions, such as '*enclosing the crops in greenhouses to contain the carbon dioxide*' or '*abandoning agriculture entirely and importing all food*'. Valid answers included '*promoting local food'*, '*reducing rice production and livestock numbers'* and '*reducing chemical fertiliser and machinery, while encouraging renewable energy'*.

GEOGRAPHY

Paper 0460/03
Coursework

General comments

This report refers to the performance of centres in the June 2023 session; however, the comments made here are equally applicable for centres that make their entries for the first time in November 2023 or during 2024.

The original entry for the June 2023 session increased by almost 50 per cent compared with the IGCSE Geography Coursework entry in June 2022. This reflected the return of most schools to a normal routine since the COVID-19 pandemic and the fact that many centres felt able to conduct fieldwork. Entries are now on a par with those seen before the COVID-19 pandemic. A very limited number of centres withdrew at the last minute. Most centres outside of the UK opted for 0460/03 while most within the UK opted for 0976/03.

The range of topics undertaken included a much greater variety compared with the June sessions in 2021 and 2022. From the table below it can be seen that whilst rivers was the most popular topic, coursework submissions on human geography topics outnumbered those on physical geography. Tourism increased quite markedly, possibly because it is now much easier to interview people without COVID restrictions in place.

	Topic	Number of centres
human	population and migration	3
	settlement and service provision	8
	tourism and recreation	36
	urban settlement	37
physical	coasts	14
	rivers	39
	weather and climate	5
others*		6

*Include economic development, environmental quality and land use, transport, vegetation, and waste management.

It is stressed that this report focuses on points where the moderation process could have been a little smoother or where candidates could improve their coursework in order to access the higher grades. Problems seen may be due to a lack of training in the coursework option and 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. It is also recommended that centres read this report's content together with the *Moderator's Comments on school-based assessment of coursework* which each centre receives.

Almost all centres which entered candidates were able to conduct their fieldwork 'in the field' without relying solely on past secondary data or online questionnaires which was necessary during the COVID-19 pandemic. Most data was collected as part of a group exercise and then collated by a teacher when candidates returned to school. The complete data set(s) were then made available to all candidates for each to work on their own individual hypotheses. However, the Moderators also reported an increase in candidates collecting 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, it is **not** recommended that candidates collect data on their own, 'in the field'. If a candidate needs 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 on a river or along a beach.

There was some concern expressed by Moderators about excessive teacher guidance outside of the data collection exercise. One Moderator reported that candidates from one centre used the same theory, identical computer-generated graphs with the same evaluative points and ideas for improvement. It is important to stress that individuality is vital in order to achieve the highest marks. This 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 use their own photographs as well as graphs, maps and field sketches.

Key messages

- A clear understanding was demonstrated by most candidates of the Route to Geographical Enquiry. This resulted in well organised studies containing the five sections outlined in the syllabus, often with a 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.
- 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 better studies, geographical models outlined in the introduction were referred to in detail in the analysis and conclusion.
- The most successful conclusions were conducted as a result 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. Too 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 poorly described and understood and there was limited justification (if any) 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 appearing in tables.
- An impressive range of data presentation methods was utilised with many demonstrating the complexity required to score well. However, 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 must be clearly utilised.
- The inclusion of photographs considerably enhanced many enquiries, but 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; however, many reasons given were too speculative and were not backed up by the findings or theory.
- Most studies clearly confirmed or rejected their hypotheses in the concluding section. The best responses backed 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. However, 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 often lacked detail.
- References to shortcomings in the methodology should only be written in the evaluation and not in the data collection section as this is a waste of the word count.
- Moderators often pointed out that some centres' submissions were excessively long and had lost focus, and they should therefore be reminded that the word limit is 2000 words. Where this is an issue, it is expected that a word count is declared in order to get the candidates to concentrate on this issue. Text placed in tables also counts towards the word limit.
- The Team of Moderators would like to compliment centres for their conscientious and copious comments made on scripts. 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.
- The Moderators stated that overall, the marking done by centres was accurate. Where there were disparities, it was usually the undermarking of Organisation and Presentation and overmarking of the

Analysis and Conclusion sections. The changes, if any, frequently occurred at the top and lower end of the mark distribution.

Comments on specific assessment criteria

As each centre will receive a separate coursework report on their own submission, which will refer to both strengths and weaknesses, it is points that are common to several centres which are reported below and are based on each of the assessment criteria in turn. Many points are the same as in past exam sessions and therefore are repeated. It is felt this is of particular benefit to new centres, although some are still relevant for the more established centres.

The criterion of *Knowledge with Understanding* tended to be assessed accurately; where disparities occurred, it was often because the marker seemed to only take the candidate's introduction into account. This is largely the knowledge element, whilst 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 how perceptive the candidate has been in stating the limitations of the study in the evaluation. Knowledge can also be introduced at a relatively late stage such as to explain trends or anomalies in the data. This can be highlighted by markers in their comments made 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 often related to theory. Where the word count is exceeded, introductions are still too long. Many followed some initial aims with a prolonged background information section. There are still 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 mentioned again. It was found that greater focus was achieved when candidates placed the theory after their hypotheses, rather than the other way round. On the other hand, some candidates tend to be far too brief in their use of theory; this was common using Bradshaw's Model or urban land use models, where once having scanned the diagram(s), just a few simple sentences (if any) to explain the relevance to the hypotheses were written. It should be noted that in the better studies, these models proved a focal point throughout, with good comparisons to the data collected.

The wording of the hypotheses is important. Nearly all those that were stated were plausible. The most successful formula seemed once again to encourage candidates to use two core hypotheses and a third chosen by the candidate him/herself. 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 guiding questions rather than statements which is acceptable. However, for some candidates this seemed to result in a failure to fully explore the findings, with a brief 'yes' or 'no' in the concluding section.

For many centres, it is recommended that more attention is given to the detail shown on location maps placed in the introduction. It was reported that the gradual improvement witnessed in recent exam sessions was now not so evident. To be effective, scale and orientation are essential and just including 'not to scale' is not helpful. It is also expected that any map, from whatever source, is utilised by the candidate. This is usually achieved by locating the sites of data collection with an appropriate key. The better examples are usually well annotated and possess clarity so that relevant detail is easily accessed. However, there are still 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. In comparison, it was noted that some candidates had spent time producing hand-drawn maps, which observed appropriate map convention and were often of a higher quality.

The criterion *Observation and Collection of Data* was accurately assessed by the markers and very few adjustments had to be made. It was refreshing to see that almost all centres were now able to undertake fieldwork data collection free from any COVID-19 related restrictions.

It must be stressed how essential it is to collect enough data to ensure the opportunity for sufficient depth of understanding and detail to be demonstrated in the analysis. Most but not all centres managed to collect questionnaires from at least the recommended 50 respondents. Those that did not were often single groups

of three or four candidates working on their own and not as part of a larger class where data was pooled. Bi-polar analyses assessing the ENVQ also managed to achieve enough locations in the area of study.

River studies represented the largest number of centres. For these, ten locations are ideal, although this was not always achievable due to constraints of candidate safety or of time. 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 apart. However, to show worthwhile trends in the parameters measured, individual sites should, at the very least, be several kilometres apart. The advantage of river studies is that a large number of different parameters can be measured, thus generating many different hypotheses which help make each candidate's coursework more individual. However, only three hypotheses should be chosen and thus this makes collection of data at six to ten different sites essential. Some Moderators also commented that candidates had described methods of data collection which were not used to answer their hypotheses. This also used up wordage which could have been utilised elsewhere

It was reported that few candidates went into any depth of discussion on their sampling strategy and its justification. This was particularly common for those undertaking questionnaires. If respondents were accessed on an opportunity basis, then it needs to be stated and justified. Even if sites for a river study are chosen by the teacher, the candidate needs to justify why they were chosen. This also applies to traffic surveys and pedestrian counts. More candidates attempted to justify the sites sampled for studies taking place in an urban environment or a tourist resort, but again explanation was very brief. Overall, it appears that methods of sampling are poorly understood.

The time given over to data collection is clearly an issue for many centres, especially when the time available on the school timetable is limited. A surprising amount of data can be collected in a relatively short space of time when a large number is 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, the data is then coordinated centrally and then 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. Micro-climate studies conducted in and around schools seem to find time management less of an issue.

Many candidates write up their data collection methodology in tabular form. These are usually well set out and even include a link to the hypothesis to which the technique being described relates. However, many 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 use of secondary data can play a valuable role; however, it is usually only to back up 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. On the now rare occasions where a centre is unable to collect primary data, then secondary numerical data such as from weather stations or censuses can be used. It must be noted that 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* and was the case for one or two centres this session.

The best studies integrated tables of collected data 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. However, there were many studies where tables of data were completely absent and it is hoped that these centres will address this weakness in the future.

Once again, Moderators stated that *Organisation and Presentation* was the criterion where on average candidates scored the most marks. However, it was also 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 location maps 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. It should also be noted that different sorts of bar graphs only count as one technique. Furthermore, where the same data is presented in several different ways, only one technique can be counted. 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. There is no place in the mark scheme to deduct marks for other ineffective or inappropriate graphs.

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 are integrating their graphs and diagrams with the text of the Analysis. This helps to ensure candidates 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. It is good practice to provide a table of contents with page numbers at the beginning of the study. However, if amendments are made, the original page numbers are not always accurate. Candidates should check this as one of the last jobs before submission of their work. More candidates are including risk assessments which undoubtedly demonstrates their organisation. There was, however, little mention of a pilot study being carried out in the main data collection exercise, which also would have added to the Organisation.

A large range of skills was demonstrated by candidates in the representation of their data. There is clearly a drive in some centres to encourage their candidates to produce more complexity and this was largely successful. Where this was not the case, there is still a reliance on basic bar charts, line graphs, pictographs and pie charts. These techniques can be located on maps 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 were rarely created to the same scale in order to facilitate ready comparison. There were also some excellent field sketches which were clearly linked to one of the hypotheses and were very well annotated. However, at times, others were rather untidy and the relevance was difficult to ascertain and features difficult to identify. Few candidates used statistical techniques such as Spearman's Rank Correlation. 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 to get the result.

Markers are reminded that, where candidates use a statistical technique such as Spearman's Rank Correlation, for it to count as a complex presentation technique, the candidates must demonstrate the complete working themselves. On some occasions, the working was incomplete; for example, the formula was not entirely filled out correctly with the data.

Unfortunately, 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. Furthermore, an increasing trend is the incorrect use of line graphs for non-continuous data. Their best use is to track data over short or long periods of time.

Several 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, this was not the case in many studies where photographs had no 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, would not count. Three appropriate annotations would be expected on any photograph for it to be complex. In addition, some centres ask their candidates to draw a field sketch as part of the data collection exercise. However, these rarely appear in the finished version of any study. Some of those that are included are rather untidy. Candidates should be encouraged to submit them but having tidied them up and with appropriate annotations.

It is best for the original hand-drawn graphs, field sketches and diagrams to be included in any study rather than being scanned into the study, albeit at an appropriate place. These become more difficult to read, especially when they are scanned in monochrome. Candidates are reminded that each graph 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 to attain the highest marks, the same range of computer-generated graphs appearing in every study that a centre's candidates submit should be avoided.

The *Analysis* continues to be overmarked by many centres, especially at the top end of the mark distribution. The requirement for reasoned explanations at Level 3 is still being overlooked by markers when reasons

given are very short and tenuous. Again, 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.

This was the weakest criterion for many candidates, in particular the level of explanation. Most analyses consisted of description derived from graphs. There was a clear effort to use all the graphs presented and to make some interpretation of the trends or patterns identified. Few responses remained at L1, but most were marooned in L2 or the bottom of L3 due to a lack of viable or detailed explanations. There were some thorough descriptions with good 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, they clearly identified anomalies from graphs, using numerical values to show why they are anomalies, and explained them with reasons that were creditable. Some manipulated their data, producing averages, for instance. However, in general, explanation was speculative with no firm foundation. Some candidates identified anomalies but put it down to candidate errors which were not substantiated. Phrases such as 'The reason might be/could be/may have been' were too common, and further backed the notion of being unreliable.

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 an understanding of the technique they had used. The correlation coefficient value itself was often poorly interpreted, especially when a correlation coefficient was produced by the computer, and no workings were shown. This lack of understanding also extended to tests for the level of significance.

The *Conclusion and Evaluation* was marked accurately apart from the highest scoring studies. Here, too much credit was given for accounts which lacked key data. The key data should be either examples of numerical data or stated characteristics shown on graphs, maps and tables which are clearly referenced; for example, 'On Fig. 2 it can be seen that….' Many responses which were given high Level 3 marks lacked the expected depth of discussion and explanation.

Most candidates summarised their findings well, although many were rather brief. All the hypotheses tended to be either confirmed or rejected. The best enquiries quoted key data or referred to figures (graphs, maps, and statistical tests) used earlier in the study, as well as providing some explanations. Unfortunately, many responses lacked the evidence to support their assertions, and explanation was rather superficial. Models or theory quoted in their introduction were not mentioned. This particularly applied to urban land use models, although Bradshaw was an exception, but 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*.

An evaluation section is an expected part of the conclusion, although 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, with better candidates stating the implications of their suggestions. Once again, sampling procedures received very little attention. In addition, there were many generic improvements suggested which needed some development, for example, 'We needed more time' or 'We should have sampled more sites'. Most of the evaluation is still reserved for negative comments rather than stating what went well and why it was effective. Weaker responses seemed more likely to make positive comments but these were rather superficial, for example, 'The fieldwork went very well' with 'very good results'. The evaluation remains a good gauge of a candidate's level of understanding of the topic undertaken.

Administration

Once again centres must 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 remaining unchanged. This made applying adjustments relatively easy, although for many centres there was no change. For those that were adjusted this was by no means across all of the mark distribution. As was the case last June, 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 to which a large negative adjustment was applied were

generally relatively new to the moderation process; the reasons would be detailed in the document *Moderator's Comments on school-based assessment of coursework* which each centre receives.

Moderators also appreciated the conscientious approach of most markers in adding comments to their candidates' scripts to justify the marks awarded, as well as those who added a cover sheet with some overall comments. 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, it would be very much appreciated if markers were to 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.

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 one or two centres which did not send enough sample scripts on this occasion, and this delayed the moderation process.

Almost all centres submitted their coursework samples on time or before the 30th April deadline, with the appropriate paperwork completed. The latter consisted of the candidate Summary Assessment Form together with the MS1 or the Internally Assessed Marks Report. Please make sure that an Individual candidate record card is attached to the front of each piece of coursework 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).

Please continue to double check the paperwork to make sure there are no mathematical errors. Very few errors were detected in this session. However, it is worth restating the following points.

Errors usually take place in one of the following instances:

- Most commonly where the addition of the assessment criteria marks on the individual candidate record card was incorrect and this was subsequently transferred to the Coursework Assessment Summary Form and then to the MS1's.
- Transcription errors from the Coursework Assessment Summary Forms to the MS1 forms. Occasionally, this may occur where an internal moderation has taken place and the candidate's original mark has been entered instead of the changed mark.

Although Moderators do correct these errors whenever they are found, it is recommended that all centres should have their candidates' marks double checked.

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 have differed markedly in standard from those of the other markers, and an internal moderation is the best way to resolve this problem.

GEOGRAPHY

Paper 0460/41
Alternative to Coursework

Key messages

Every examination is different but there are usually a few generic tips and key messages that need making that should improve candidate performance in future. Most of these have featured in previous reports but the same issues do keep coming up again despite the entry being a fresh batch of candidates with several new centres. Here are a few key messages that the Examiners feel will benefit future candidates if they are passed on by teachers.

- When answering hypothesis questions that ask whether you agree or not, always give your opinion first before any supporting evidence. This will usually be *Yes, No*, or *Partially* / *To some extent*. If you are asked to support your decision with data, then statistics must be used from the resources referred to. Data is quantitative; evidence can be qualitative or quantitative. If you make an incorrect conclusion to the hypothesis, you will gain no credit for the answer.
- When giving figures in an answer, always give the units if they are not stated for you.
- 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, it is important to use paired data rather than one set on its own.
- Check you are using the resources that a question refers you to, e.g. *Support your answers with evidence from Fig. 1.6 and Table 1.3.*
- Attempt all completion tasks on graphs, tables, or diagrams – not all the answers are on lines and in writing. Many candidates miss out on relatively easy marks by not attempting these types of questions.
- Consider the marks awarded. Examiners do not expect you to be writing outside of the lines provided, so do not write a paragraph when only two lines are given as this wastes time.
- If you have to write more than the lines allow, indicate this with a phrase such as (*continued on additional page*). This is very helpful to the Examiner in finding your answers.
- When completing graph work use a dark-coloured pencil or pen. Use a ruler to draw lines. Always shade bar graphs and pie charts accurately. Make sure the shading matches that shown in the key.
- When you think you have finished, check that you have not missed out a question. Some questions may be hard to spot if they are on pages with a lot of graphs or maps. Make sure you have answered the questions on every page. This applies especially to questions where you 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. The overall range of marks went from 0 to 52 out of 60 which is similar to previous years. Weaker candidates scored on the practical questions, such as drawing and interpreting graphs and tables, and candidates of higher ability scored well on the more challenging sections requiring explanation and judgement, especially regarding hypotheses. Most candidates answered **Question 1** slightly better than **Question 2**.

There is less general advice to be given on areas for improvement with this paper compared with others. As there are no choices to make, it is difficult to miss out sections, although some candidates omit graph completion questions which are seen as being 'easier' to answer. This is an on-going problem from year to year despite it being highlighted in each report. Although there were no significant reports of time issues, some candidates do write too much in some sub-sections. They should be encouraged to answer more succinctly and perhaps give more thought to their answers. However, a significant number of candidates did not attempt later questions. Most points for teachers to bear in mind when preparing candidates for future Paper 41 questions relate to misunderstanding or ignoring command words, and to the use of appropriate

fieldwork techniques and equipment. Questions where candidates did not score well often related to them not carefully reading the question, for example **Question 1(c)(iii)** where some candidates focussed on other methods to reduce the negative impacts of a factory rather than the method they had chosen. As in some previous papers, **Questions 1(d)** and **2(c)(ii)** required candidates to suggest a suitable methodology to extend or improve the fieldwork. This type of question is frequently included on this paper and is an area which centres can practise with candidates. However, it is not good practice to develop a series of generic improvements which may apply to all fieldwork, as such suggestions tend to be vague and not worthy of credit.

Centres should realise that, although this is an *Alternative to Coursework* examination, candidates will still be expected to show that they know how fieldwork equipment is used and appropriate fieldwork techniques, even if they have only limited opportunity for fieldwork within the centre. For example, **Questions 1(b)(i)**, **2(a)**, **2(b)(i)**, **2(d)(i)**, **2(d)(ii)** and **2(e)(ii)** focussed 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 correctly identified that the cement industry is a manufacturing industry. The most frequently chosen distractor was assembly industry.

(ii) Nearly all candidates correctly identified an input and an output of the industry.

(b)(i) Candidates' knowledge of sampling was weak, and some candidates wrote answers which revealed no understanding of the sampling method, e.g. naming a method as '*knock on residents' doors*', '*survey*' and '*choosing people*'. There was also a 5 per cent omission rate of candidates who did not attempt an answer. Where candidates did have some knowledge of sampling, their answers varied in quality. All three sampling methods were chosen by candidates, but weaker answers mixed up the name and description. These candidates also repeated the word '*random*' when describing random sampling. Random and systematic sampling were the most common methods named. Better responses correctly answered all three parts of the question, including a reason why the chosen sampling method was suitable.

(ii) Many candidates referred to the 1 to 5 scale in the questionnaire, but only better responses went beyond this to explain how the scale showed different levels of concern through the number given to each problem.

(iii) Most candidates correctly drew the horizontal bar. Some were drawn on either the 290 or 300 lines, but most were within tolerance. A positive point is that most candidates appeared to have drawn their bars carefully using a ruler.

(iv) Similarly, most candidates drew the vertical bars accurately. Weaker responses had misread the scale and drawn the bars to the wrong score, particularly to 2.9 for the '*looks ugly*' problem.

(v) This question discriminated well. Most candidates recognised the similarity between the results of the problems for all age groups. Better responses identified the pattern for the high scoring problems and the low scoring problems and used data effectively to support their statements. A few candidates incorrectly focussed on differences or exceptions to the general pattern, even though they were told that the hypothesis was generally true. A common mistake was that candidates stated that '*all age groups scored air pollution the highest*' or '*all age groups scored trees are chopped down the lowest*'. This was not true as the data shows three of the four groups stated this.

(vi) The question was challenging for many candidates but proved to be a good discriminator. The best answers linked specific concerns to groups of people, using information in **Fig. 1.2**, e.g. '*families with children are concerned because the children cannot concentrate in school because of the noise'*, or '*people who work at the factory will be less concerned about the impacts because they earn their wages there*'. Some candidates suggested ideas about the global environment such as global warming and rising sea levels which were not accepted.

(c)(i) Many candidates scored two marks by completing the pie graph accurately. They drew the dividing line at 71 per cent or within tolerance and with appropriate shading of the two segments. Some lost one mark because they plotted the segments in the wrong order and did not follow the order of the key, although the shading was accurate, and a few others did not gain the shading mark as the horizontal shading was unclear.

(ii) Most candidates correctly disagreed with the hypothesis. They then supported their decision by identifying '*make a law*' as the most popular choice or '*build a clinic*' as being more popular than close down the factory. Better responses then gave statistics to compare the different methods.

(iii) This question discriminated well. All four methods were chosen by different candidates with '*build a clinic*' being the most popular choice. Most candidates tried to justify their choice by referring to its advantages and disadvantages. Many also referred to the advantages and disadvantages of the methods rejected, though this was not required in the answer. Better answers were characterised by a range of clear ideas for and against the proposed method, whilst weaker responses suggested fewer ideas very simply, e.g. closing the factory will '*solve the problems*'. The best answers were based on the methods of closing the factory and building a clinic.

(d) This question was not answered well by many candidates. There was also a 4 per cent omission rate. Often candidates confused a bi-polar survey with a questionnaire survey and described the use of the questionnaire with residents. Few of these candidates scored any marks at all. Candidates who were familiar with a bi-polar survey scored well for their ideas about considering each problem and giving it a score at different distances from the factory. Many candidates did not focus on what the students would do in the bi-polar survey, e.g. complete the distance statement on the sheet, tick the box to show the score, but instead focussed incorrectly on how the form was created. Some candidates had no understanding of what a bi-polar survey is and wrote about a variety of irrelevant fieldwork techniques such as using noise meters, traffic surveys and collecting dust samples.

Question 2

(a) Many candidates identified both correct options. A significant number selected just one option rather than two as instructed. The correct advantage most often chosen was '*practise fieldwork techniques*'. The most frequently chosen distractor was '*look at different features along the river*'.

(b) (i) Most candidates identified '*callipers'* as the correct fieldwork equipment to measure pebbles. The most frequently chosen distractor was '*hygrometer'*, although '*quadrat'* was also chosen by a significant number. These choices suggest that some candidates are unfamiliar with some specific fieldwork equipment.

(ii) Most candidates drew the bars in the histogram accurately. They first had to count the number of pebbles in each group before they could plot the information. However, 10 per cent of candidates did not attempt to draw the bars. Weaker responses had plotted the wrong figures because they were unable to group the pebbles correctly.

(iii) This question was answered poorly by many candidates. Few candidates stated that there was no pattern or correlation. Many suggested that pebbles became larger downstream, but the evidence does not support this idea. Most candidates gained credit for a statement and / or data about the variation in pebble numbers at different sites.

(c)(i) Many candidates gained some credit for their answers, but it was rare to see a full mark answer. Candidates often described or named an erosional process such as '*corrasion'* or '*attrition'*. Weaker responses suggested '*erosion*' was the reason, but this was too vague to gain credit. Also, some candidates suggested that an increase or decrease in velocity would cause pebble size to reduce downstream, not showing an understanding of river processes.

(ii) The question differentiated well between candidates. Better candidates realised that a bigger sample size would result in less effect of any anomalous measurements, and two students measuring each pebble would improve the method as measurements would be checked and any errors could be rectified. Weaker responses were vague such as '*measuring 40 pebbles would give more results*' and '*two students could compare results*' without explaining how they would improve the reliability of the fieldwork method.

(d)(i) 6 per cent of candidates did not attempt to describe the method. Other candidates found the question difficult, although it differentiated well. Better candidates who were familiar with this fieldwork method gave clear descriptions and scored full marks. Other candidates scored one or two marks, usually for description of how ranging poles are used and how the clinometer is used to measure the angle of slope. Weak responses did not understand the methodology and wrote about using the clinometer to measure distance or how it could be used to measure river velocity.

(ii) Candidates generally scored well. The main advantages suggested were that a digital clinometer gives instant, accurate results which are easy to read and result in fewer measuring errors. The main disadvantages included references to phones getting wet or the battery running out.

(iii) Most candidates circled the correct measurement, but there were many incorrect answers. These included some who circled 11 as an average measurement, and others who circled 9 at site 1 or any figure which appeared twice at one site, e.g. 13 at site 1. Many candidates who circled 18 were able to explain that this was likely to be an anomaly or bigger than other measurements. 5 per cent of candidates did not attempt the question.

(iv) 10 per cent of candidates did not attempt the question. Most candidates plotted the average angle accurately, using a horizontal line. Careless errors included drawing the line at site 3 not site 4, plotting an 'X' rather than a line, and drawing the line at 6 or 8 degrees.

(v) The omission rate for this question was 6 per cent. Most candidates correctly agreed with the hypothesis or said it was partially true. Many were able to back up their decisions by including valid statistics about average measurements at different sites, usually sites 1 and 5. Better candidates also identified the anomaly at site 3 or 4 which does not follow the general pattern.

(e)(i) Apart from the 8 per cent of candidates who did not attempt the question, most candidates gave valid suggestions for a hypothesis to test, either in the form of a statement or a question. Common hypotheses focussed on river velocity and channel width and depth. Some candidates suggested hypotheses to do with bedload or gradient, ignoring the question instruction. Other candidates suggested hypotheses which would be difficult or impossible to investigate through fieldwork, such as roughness of the river channel, the amount of load, and river discharge.

(ii) The question discriminated well. 11 per cent of candidates did not attempt to answer the question. The best answers focussed on measuring river velocity using ranging poles and a float. Many candidates gave a detailed description of this method. Other methods included less detail about how the measurements would be taken, especially using a flow meter to measure velocity. Also, descriptions of methods to measure width or depth of the river channel were often superficial with no detail of how the measurements would be made.

GEOGRAPHY

Paper 0460/42
Alternative to Coursework

Key messages

- When answering hypothesis questions that ask whether you agree or not, always give your opinion first before any supporting evidence. This will usually be *Yes, No* or *Partially / To some extent*. Do not just copy out the hypothesis if you agree with it. It is important to make a decision and state it as well as provide the data or evidence for your choice. Be clear in your decision – expressions such as '*might be true*', '*could be false*', '*true and false*', '*generally true*' are too vague.
- If you are provided with a decision about a hypothesis such as in **Question 1(d)(iii)** where candidates were told that the hypothesis was *Partially True,* do not then disagree with it and try to justify a different decision. You need to support the decision made with evidence.
- Note that if the question requires data as evidence such as in **Question 2(e)(ii)** on this paper, you must give numbers and statistics; descriptive statements will not count for credit. If evidence is asked for, this can include numbers and descriptive statements. If the question says *'…do **not** use statistics*' as in **Question 2(g)**, then only descriptive statements will be credited.
- When giving figures in an answer, always give the units if they are not stated for you, e.g. **Question 1(d)(iii)**: *'There were 14 pebbles between 10.1–15 cm at C'*. It is also important that your numbers are clear, for example, a 1 can look like a 2; 4 can look like a 9; 7 can look like a 1, sometimes 2 looks like a 5. Candidates' 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 make sure to use a sharp pencil as this gives a clear dark image. Check you understand the scales used and the importance of any plots provided. If adding plots to complete a graph, these should be in the same style as the plots already on the graph, e.g. in **Question 1(c)(ii)** and **(iii)**, one plot was a cross, the other a line beneath three crosses.
- When completing bar graphs, make sure your shading matches the key, for example if the shading is horizontal, do not draw shading that slopes to the right or left. These points were important in **Question 1(d)(ii)** and **Question 2(e)(i)**. Shading is not always credited, but it is good practice to do it correctly as it may count for a mark.
- If you need to refer to data from a table or graph, use the exact figures from the table rather than make erroneous judgements from the graph. Try to avoid words like *'almost'*, *'nearly'* or *'approximately'* and choose a precise number, e.g. in **Question 2(d)(ii)**.
- When you think you have finished, go back and check that all graphs have been completed; too many candidates lose marks by missing out graphs, e.g. **Question 1(b)(ii)**, **Question 1(c)(ii)** and **(iii)**, **Question 1(d)(ii)**, **Question 2(d)(i)**, **Question 2(e)(i)** and **Question 2(f)(i)**.
- Read questions carefully and identify the command word, e.g. '*describe'* or *'explain'.* A question that asks *'Why?*' requires a reason to be given, not a description.
- Check you are using the resources that a question refers you to, e.g. **Question 2(f)(i)**, Table 2.4 (Insert) and Table 2.5 (Insert).
- Consider the marks awarded. Examiners do not expect you to be writing outside or below the lines provided, so do not write a paragraph when only two lines are given as this wastes time.
- 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 per cent of the statistics being described and is not a term that will be accepted if the data involved is less than 50 per cent, e.g. **Question 2(f)(ii)**.
- It is important that, when you write the remainder of an answer elsewhere, you signal this by writing something like *'continued on page 16'* to ensure it is seen. It needs also to be noted that several candidates gave the wrong sub-section number to their extra work which makes it difficult to match to their earlier answer.
- If you need to add extra work, make sure you use the extra pages provided; do not request an additional booklet if the additional pages have not been used.
- You are expected to have a calculator, protractor and a ruler in this exam; it was clear that in several cases these did not appear to be used, for example drawing freehand bar graphs in **Question 1(d)(ii)**.

Sharp pencils also produce a more accurate plot on bars; a few drawn lines were too broad to judge accuracy.

General comments

Most candidates found this examination enabled them to demonstrate what they knew, understood and could do. It appeared to be a positive experience for many candidates with most questions being attempted and most achieving marks on most sections. The overall range of marks was from 0–59 with weaker candidates scoring on the practical questions, such as drawing graphs or completing tables or making choices from tables, and those of higher ability scoring well on the more challenging sections requiring judgement and decision-making on hypothesis choices with evidence and other written answers.

There is less general advice to be given on areas for improvement with this paper. As there are no question choices to make, it is difficult to miss out sections, though candidates still do (especially completion of graphs). There were no reports of time issues; the structured booklet format does not encourage over-writing of sub-sections, although **Question 2(g)** did lead to many unnecessarily lengthy responses covering more than a side of A4.

Most points for teachers to consider, when preparing candidates for future Paper 42 questions, relate to misunderstanding or ignoring command words and the importance of experiencing fieldwork, even if it is only in the school grounds or simulated in the classroom. Particular questions where candidates did not score well often related to them not fully reading the question or just completely missing out straightforward graph completions. This means that some candidates do not obtain a mark in line with their geographical ability.

Centres should realise that, although this is an *Alternative to Coursework* examination, candidates will still be expected to show that they know how fieldwork equipment is used and about different fieldwork techniques. Any fieldwork experience is worth doing even if there is only 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 be taught and demonstrated within the classroom or school, but it tends to be poorly answered by many candidates.

Comments on specific questions

Question 1

(a) The key to answering this question well was to realise that the suggestions by the teacher were to do with staying safe on the beaches. Those that realised this and focussed their ideas on safety issues scored high marks, but other irrelevant suggestions did not gain credit. Charging their phones would be a good idea in case of emergencies, not just to keep contact with each other or work out calculations. Checking the weather forecast would find out if storms or high winds, for example, might result in postponing the work, not just that it might rain so they would get wet. Organising the students into groups of three was not to check on each other's work or collaborate but to help in case of a problem such as an injury, where one could stay with the injured student while the other went for help. Checking the tide tables would indicate when a high or low tide might take place so they could assess the risk of being stranded or trapped on the beach or being swept away, not to find out when the most amount of beach would be accessible to carry out the work. Candidates tended to lose sight of the 'safety' angle as they worked through the four suggestions or just referred to 'safety' without any elaboration.

(b) (i) A significant minority did not attempt the question on measuring wave frequency. This is a standard fieldwork exercise conducted at the coast and involves counting waves over a fixed time. To gain marks candidates needed to identify a point or use a pole or just note how many times the waves broke on the beach in a fixed time using a timer or stopwatch. It was not enough to suggest just counting the waves in a minute as they were told that in the question. The waves had to do something, for example break, crash, hit a pole or pass a person standing in the water, and a timer or stopwatch was needed to check the fixed time of the counting. Repeating the exercise and working out an average was an extra credited suggestion but not just working out an average. Many suggested using a counter or clicker; however, as the highest number of waves likely to be counted would be less than 15 waves per minute, a counter or clicker was not required so this was not credited. A small number included a clinometer in their wave-measuring equipment whilst others wrote about beach profiles or mentioned rivers. A few suggested measuring floating objects over a fixed distance and painting pebbles on the beach and tracking them, which were all irrelevant responses.

(ii) This was quite a challenging plot to do but many placed it exactly on the 13.2 line. To get the mark for 13.3, however, it needed to be just above it which was achieved by just below half of the candidates. A small number did not attempt the plot, and others were careless in locating it or drew the line freehand despite the fact that they should have a ruler with them for the examination.

(c) (i) Measuring slopes or velocity along rivers involves fieldwork techniques similar to those for measuring beach profiles, and this has been a regular question in previous exam sessions, but many candidates did not gain high marks for it. A few discussed how they would measure river velocity. The diagram in the Insert needed studying as it indicated the equipment to use and how the students did the measuring. Several candidates did not appear to have used the diagram as they suggested putting the ranging poles at 5 or 10 metre intervals despite the diagram showing that they were placed at breaks of slope. Too many also thought the clinometer measured distance or gradient when it just measures the angle. The best answers used the diagram and referred to the ranging poles being inserted vertically at the breaks of slope at the same height above the beach and the string being attached at an agreed height to both poles, so that the clinometer could be aligned along the string to read off (not calculate) an angle. They then added that it measured the beach profile by repeating the operation from the low water mark up to the back of the beach. A number of candidates involved wave frequency in this question, which was irrelevant.

(ii) Half of the entry realised that there was only one measurement of 9 degrees at Beach A and plotted the cross correctly where the 9-degree angle of slope on the vertical axis met the number 1 on the horizontal axis. However, a significant minority did not attempt this question.

(iii) Drawing the average line at 6.8 degrees was done successfully by the vast majority of candidates. Just a few drew it slightly above or below the line and a small number did not attempt it. As is often the case, a few plotted a cross instead of a line or drew the line freehand and outside the correct range beneath the crosses above.

(iv) Almost all candidates made the correct decision that the hypothesis was true. However, many just described the steepness and wave frequency at C as being high, but what was needed for supporting evidence was a comparison with Beach A, which had the lowest angle and wave frequency, plus comparative statistics for Beaches A and C. A small minority missed out this question, but many gained 3 marks.

(d) (i) The question asked how the student would measure the size of the pebbles after collecting a sample of 30 from the beach; they did not have to describe how to collect the pebbles. However, many candidates described sampling techniques to collect the pebbles, despite being told that they had already been collected. The best answers focussed on using callipers, measuring tapes, pebbleometers or rulers to measure the longest length/axis of each pebble in millimetres or centimetres as indicated on Table 1.3. Several candidates described elaborate ways to measure volume or weight or use a roundness chart, none of which are to do with size. This highlights the importance for candidates to study the resource provided and to read it carefully before they answer the question.

(ii) Candidates successfully completed the three graphs despite this not being a straightforward graph completion exercise. They had to add up the number of pebbles in the three defined categories from the list in Table 1.3 and then plot the totals 7, 9 and 14. Overall, this was well answered. A few missed it out and some plotted numbers that were not whole as a few appeared to have calculated averages within each category instead of just adding them up. Candidates should be aware that sometimes shading also gains credit and it should be done in the correct way, in this case matching the direction of the diagonals in the graphs for the other two beaches.

(iii) This question was a good differentiator as many candidates ignored the variation in wave frequencies between the beaches and focussed on describing the difference in pebble sizes and numbers without any comparative explanation of why the hypothesis was partly true. Few candidates achieved 3 or 4 marks, but those who did gave evidence for supporting the hypothesis, such as Beach A having the lowest wave frequency and lowest number of large pebbles compared to Beach B or C which had higher frequencies and larger pebbles, in both cases proving the hypothesis to be true. To make the hypothesis partly true, they then gave evidence against the hypothesis such as Beach B having a lower wave frequency than Beach C but having a greater number of large pebbles, again backed up with data. Answers arguing against the hypothesis were better than those for it.

(e) Many candidates did not attempt this comparison between constructive and destructive waves which is an essential part of studying coastal processes. The question required a comparison between the two types of waves not what they did regarding sediment or longshore drift, which was seen in several answers. References to swash, backwash, height, frequency, wavelength and amplitude all gained credit. Judgements such as less/more aggressive or vague answers such as small/big, slow/fast were not specific enough, and their suitability for surfing or paddle-boarding was irrelevant.

Question 2

(a) Most candidates chose '*natural*' as the correct answer for the best word to describe the hazards of earthquakes, landslides, and heavy monsoons. '*Tectonic*' was the most common error, as was ticking three boxes instead of one.

(b) (i) The advantages and disadvantages of random sampling proved to be quite a challenging question for most candidates. The most common correct advantage was that it can be quick, easy to use or that there would be less bias. A few stated that it might be a disadvantage by not being representative and a few said it would take time, though that needed qualifying depending on which random technique was used. If random sampling involved asking anybody, that could be relatively quick, but if it used random number tables or a generator, it would take more time. A common error was to suggest difficulties with using the questionnaire, giving answers more relevant to **Question 2(c)(ii)**.

(ii) Questions on sampling techniques such as *systematic*, *random* and *stratified* are often set on Paper 4, but candidates frequently show a lack of knowledge and/or understanding about them. This particular question asked for 'other' sampling techniques, yet some candidates still wrote about random sampling. Of those that answered the question well, systematic was the most common answer followed by stratified. The question asked about a technique to sample people, but some candidates suggested inappropriate examples. For instance, for systematic – ask every 10 minutes or every 20 metres, neither of which were practically appropriate. The best answers suggested regular or equal intervals such as every 5th or 10th or nth person. The stratified choice was less well done as candidates tended to just say '*select people by age'* rather than '*by age-groups*' or '*by gender*'. Few then went on to suggest selecting people in those groups related to the population profiles. Inappropriate techniques suggested included '*point sampling, group sampling, interviews or questionnaires, selective sampling, strategic sampling and quadrat sampling'*.

(c) (i) Most candidates could provide a definition of primary data that was acceptable. The most common answers referred to it being '*first hand*' or '*original*' or data the students collected by themselves.

(ii) This was well done by most candidates, although a few described errors in the content of the questionnaire rather than the practical difficulties of collecting the data. Difficulties in using the questionnaire covered language difficulties, the ability to read or write, the issue about providing private information, and the people being too busy or not wanting to take part. A few also realised that, for a student to carry out 100 questionnaires in each village was a lot to do and that the sample might not be covered. Equally, that if the questionnaire was issued, they might not get them back or they could be incomplete. Answers related to the cost of printing and the amount of paper used were not credited.

(iii) This was a successful question with the vast majority correctly choosing *'interview'* as the better option that could be used to collect the data.

(d) (i) While the plots at 25 per cent and 85 per cent were relatively straightforward and mostly accurate, many candidates also drew accurate lines on the pie graph as well as shading the sections correctly. A few did the diagonal shading in the wrong direction, but most candidates gained 2 or 3 marks here.

(ii) Most candidates correctly decided that the hypothesis was false or incorrect and that Kanyam had a higher level of education than the inhabitants in Chamaita. Most made a correct supporting statement such as Kanyam had a higher percentage in secondary education than Chamaita and provided supporting data with 43 per cent of Kanyam in secondary compared to just 22 per cent in Chamaita. Comparing the number that had no formal education at all was also used to support a correct decision. A few opted for '*partly true*' based on the higher primary percentage in Chamaita; they needed to look at the overall data here to see that Kanyam had the higher level of education.

(e) (i) While a significant minority did not complete the divided horizontal bar graph, those that did it scored well. A few plotted the line at 70 instead of 72 and one or two shaded the diagonals in the wrong direction, but overall, most obtained 2 marks here. A few reversed the plotting and also reversed the shading.

(ii) Candidates needed to provide separate comparisons that referred to different uses of fuel for cooking and for lighting in both villages. Several managed to provide detailed answers comparing the overall uses of fuels without any reference to cooking or lighting, thereby gaining no marks. The best answers compared the highest fuel used for cooking in both villages, e.g. firewood in Chamaita and electricity in Kanyam, with supporting data (46% / 39%) and also gave a similar answer for the importance of candles in Chamaita as opposed to electricity for lighting in Kanyam. A few described in detail the use of fuel in each village but with no comparison, while others described similarities.

(f) (i) A number of candidates did not answer this question, but those who did gained the mark by correctly plotting 22. The main error was in not checking the horizontal scale and plotting the line two squares across from 20 at what was actually 24, not 22.

(ii) This was answered quite well, although a lot of candidates spent too much time suggesting why Chamaita was not economically developed instead of focussing on the evidence of increased economic development in Kanyam as required. The best answers identified the low percentage of subsistence farming, some secondary industry with the tea factory and the increased tourist activity with examples providing income and jobs in Kanyam. A few candidates referred to the villages as separate countries.

(g) There were some lengthy essay-type answers to this question that often used the additional pages. The lines provided should have been enough to discuss their solutions for 5 marks as more concise focussed answers might have been more effective and saved candidates' time. Most candidates scored at least 2 marks, with many achieving all 5 marks. The key to success was to provide reasons as to why Chamaita would find it hard to develop economically. Table 2.6 in the Insert listed the six problems identified by the questionnaire and candidates were allowed a maximum of 2 marks per problem to ensure the answer covered at least three of the problems. Most candidates could suggest how and why these problems would limit economic development, but not all focussed on the '*economic development*' idea, although the more able could link some problems to this, for example poor sanitation could cause disease leading to a reduced workforce. This was done well, although a small minority did not attempt it.

GEOGRAPHY

Paper 0460/43
Alternative to Coursework

Key messages

Every examination is different but there are usually a few generic tips and key messages that need making that should improve candidate performance in future. Most of these have featured in previous reports but the same issues do keep coming up again despite the entry being a fresh batch of candidates with several new centres. Here are a few key messages that the Examiners feel will benefit future candidates if they are passed on by teachers.

- When answering hypothesis questions that ask whether you agree or not, always give your opinion first before any supporting evidence. This will usually be *Yes*, *No*, or *Partially* / *To some extent*. If you are asked to support your decision with data, then statistics must be used from the resources referred to. Data is quantitative; evidence can be qualitative or quantitative. If you make an incorrect conclusion to the hypothesis, you will gain no credit for the answer.
- When giving figures in an answer, always give the units if they are not stated for you.
- 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, it is important to use paired data rather than one set on its own.
- Check you are using the resources that a question refers you to, e.g. *Support your decision with evidence from Fig.1.8 and Table 1.3*.
- Attempt all completion tasks on graphs, tables, or diagrams – not all the answers are on lines and in writing. Many candidates miss out on relatively easy marks by not attempting these types of questions.
- Consider the marks awarded. Examiners do not expect you to be writing outside of the lines provided, so do not write a paragraph when only two lines are given as this wastes time.
- If you have to write more than the lines allow, indicate this with a phrase such as (*continued on additional page*). This is very helpful to the Examiner in finding your answers.
- When completing graph work, use a dark-coloured pencil or pen. Use a ruler to draw lines. Always shade bar graphs and pie charts accurately. Make sure the shading matches that shown in the key.
- When you think you have finished, check that you have not missed out a question. Some questions may be hard to spot if they are on pages with a lot of graphs or maps. Make sure you have answered the questions on every page. This applies especially to questions where you 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. The overall range of marks went from 0 to 58 out of 60 which is similar to previous years. Weaker candidates scored on the practical questions, such as drawing and interpreting graphs and tables, and candidates of higher ability scored well on the more challenging sections requiring explanation and judgement, especially regarding hypotheses. Most candidates answered **Question 2** more successfully than **Question 1**.

The following general advice is given about areas for improvement in the *Alternative to Coursework* paper. As there are no choices to make, it is difficult to miss out sections, although some candidates omit graph completion questions which are seen as being 'easier' to answer. This is an on-going problem from year to year despite it being highlighted in each report. Although there were no significant reports of time issues, some candidates do write too much in some sub-sections. They should be encouraged to answer more succinctly and perhaps give more thought to their answers. Most points for teachers to bear in mind when preparing candidates for future Paper 43 questions relate to misunderstanding or ignoring command words, and to the use of appropriate fieldwork techniques and equipment. Questions where candidates did not

score well often related to them not carefully reading the question, for example **Question 2b(ii)** where some candidates suggested how the questionnaire could be improved rather than giving advice on how it could be used with people. As in some previous papers, **Question 1(e)(iv)** required candidates to suggest how a fieldwork method could be improved. This type of question is frequently included on this paper and is an area which centres should practise with candidates. However, it is not good practice to develop a series of generic improvements or methodology which may apply to all fieldwork, as such suggestions tend to be vague and not worthy of credit.

Centres should realise that, although this is an *Alternative to Coursework* examination, candidates will still be expected to show that they know how fieldwork equipment is used and know appropriate fieldwork techniques, even if they have only limited opportunity for fieldwork within the centre. For example, **Questions 1(a)(ii)**, **1(f)(i)**, **2(b)(i)** and **2(b)(ii)** focussed on specific 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) Nearly all candidates chose the correct hazard. A few chose hypothermia, possibly because it was the second highest scoring risk hazard.

(ii) This was well answered by many candidates with a lot referring to appropriate footwear to avoid slipping, warm clothing to prevent hypothermia, and working in groups or taking mobile phones to avoid getting lost or separated. Many weak responses about being '*careful*' were given by low scoring candidates, as were statements such as '*more clothes*' or '*enough clothes*'. A few candidates gave irrelevant answers such as building a hospital close to the beach to treat the hypothermia, taking a towel to dry off after swimming, and erecting signs to warn of the danger of falling on the beach. A few weak candidates suggested staying safe by not going on the beach at all.

(b) (i) Many candidates linked all three processes and definitions correctly. One mark was often awarded, in which case it was either attrition or hydraulic action which was correct. Many answers had evidence of crossing out which indicated uncertainty in candidates' answers.

(ii) The question differentiated well. The most popular answers referred to the strong waves and the weak cliff material, although other good answers focussed on the lack of natural and / or human protection for the cliffs. Weak candidates incorrectly referred to swash and backwash, tides, rising sea level, extreme weather, and winds. Other candidates wrote about one or more erosional processes, copying the information from the previous question, and did not gain credit.

(c) This question discriminated well, although weaker responses found it difficult to write precisely enough to fully meet the mark scheme demands, despite some awareness of the processes occurring. Some candidates described the diagram provided in the Insert but showed no real understanding of the processes. For example, many referred to '*zigzag movement*' without including the key words '*along the beach*', and many wrote about the process being repeated without the key words '*with each wave*'. Some candidates did not refer to movement of material with swash or backwash. There were some misconceptions, particularly that the wind moved the beach materials, and the angle of swash and backwash was sometimes reversed by candidates. Most candidates gained credit for the idea of swash going up the beach. Many tried to link the prevailing wind with wave direction but did not refer to the '*waves driven by the wind*' idea.

(d) The correct statement was the most common one selected; the three distracters were all chosen, with '*they stop waves breaking on the beach*' being the most common wrong answer.

(e)(i) 7 per cent of candidates did not attempt to draw the bars. Most candidates scored both marks by drawing the bars accurately. A common mistake was made by drawing the 0.55 m bar at 0.75 m. With the small scale, candidates had to take care and be precise. Many were drawn carelessly, some without rulers, which sometimes resulted in a candidate losing the mark as the top of the bars did not coincide with the correct gridlines or were drawn at an angle. Some candidates made the mistake of drawing the bars upward from the 1.5 m line. Plotting should have been from the 0 m line down.

(ii) The correct answer was chosen by most candidates, with '*east to west*' being the most common wrong answer. There were, however, some candidates who chose either '*north to south*' or '*south to north*'. To be sure of their correct answer, candidates needed to understand the concept of groynes and how they block the movement of sand along a beach.

(iii) The question proved difficult for many candidates. They did not read and understand that the horizontal scale on **Fig. 1.5** showed '*distance along the groyne from top of the beach*', not distance along the beach. Candidates needed to compare the west side of the groyne with the east side and give supporting statistics. While better candidates identified the correct evidence and used the data to support their statement, weaker candidates thought that the beach was higher on the east side of the groyne because the figures were higher. They ignored the fact that they had previously plotted from the 0 m line downwards on **Fig. 1.5**. Some struggled with their wording and mixed up the height of the beach and the difference in height between the top of the groyne and the beach. Also, some candidates gave some data from east and west sides of the groyne but did not identify what the statistics showed, e.g. '*it is 0.29 m on the west and 0.48 m on the east at 2 m*'.

(iv) The ideas of repeating the measurements at different groynes and taking measurements at smaller intervals on the groyne were the most common correct responses. Some candidates scored marks by referring to other groups checking accuracy or comparing results, but not all included the key words '*check*' or '*compare*'. Other errors were the ideas of taking measurements on a different beach which would not back up the results on the original beach, and '*using more accurate measuring equipment*'.

(f)(i) This question was not answered well by many candidates. There was also a 5 per cent omission rate. Often candidates confused a bi-polar survey with a questionnaire survey and described the use of the questionnaire with random tourists or residents. Few of these candidates scored any marks at all. Candidates who were familiar with a bi-polar survey scored well for their ideas about observing each protection method, rating each factor, working out a total. Only the best candidates also recognised the need to discuss what each score meant, and the importance of standardising responses. Some candidates did not focus on what the students would do in the bi-polar survey, e.g. circle the method of defence on the sheet, tick the box to show the score, but focussed incorrectly on how the form was created. Other irrelevant answers included ideas such as how to find out construction costs through searching secondary data.

(ii) Nearly all candidates correctly drew the bar, although 7 per cent of candidates did not attempt to draw it. Occasionally, candidates drew the bar to minus 1 or drew it to the left of the correct position.

(iii) Again, nearly all candidates correctly calculated the total score for the sea wall, but 4 per cent did not give an answer.

(iv) The question was well answered by many candidates. Most correctly stated that the hypothesis was partly true and used appropriate evidence from **Fig. 1.8** to back up their opinion. Some candidates compared individual features of the bi-polar survey rather than the total scores, which confused their answer. Some candidates did not use data, so scored only three marks, and others did not refer to the specific sea defences with their data, e.g. '*two were negative and one was positive*'.

Question 2

(a) (i) The correct answer was the one selected by most candidates. The three distracters were all chosen by some candidates, with '*the area around a town or shop*' being the most common wrong answer.

(ii) Nearly all candidates correctly identified bread as the low-order good. A few wrongly identified jewellery or mobile phone.

(iii) Nearly all candidates correctly identified a laptop computer as the high-order good. Where candidates did not understand the difference between low- and high-order goods, they usually made the wrong choice in both sections.

(b)(i) Most candidates scored one or both marks with the most common ideas referring to the question being too personal or intrusive, and any answers being too vague or not useful in some way. Some candidates only scored one mark because their ideas were alternatives in the mark scheme. A common wrong answer was that the person was a tourist or did not live in Rio. Some candidates stated that the question was unnecessary because the idea was covered in the questionnaire, but the correct reason was that it was unnecessary to prove or disprove the hypothesis.

(ii) The question was generally well answered with many candidates scoring two or three marks. Many different suggestions were given, with candidates emphasising politeness, not working alone, recognising that some people would not want to answer, introducing themselves or explaining the purpose of the questionnaire, and asking a variety of people. Some candidates wrongly wrote about the questionnaire itself, suggesting ideas for questions which should or should not be asked.

(c)(i) 15 per cent of candidates did not shade in the two boroughs on the map. Candidates who attempted the question usually shaded in the two boroughs correctly. Few candidates who lost marks did so because they used the wrong type of shading; it was usually because they wrote in the name of the borough rather than shading it. A few carelessly shaded Tijuca such that the lines were clearly not horizontal or shaded with dashed lines which was the shading for 3–9 people.

(ii) Most candidates placed the four boroughs in the correct order, although a significant proportion reversed the order. The other main error was to rank the boroughs from the map showing the Barra shopping centre.

(iii) This question discriminated well. Most candidates correctly agreed with the hypothesis, although there were some who wrongly opted for '*partially correct*'. The evidence that candidates used to support their decision was sometimes confused. Some candidates focussed incorrectly on the number of people coming from each borough rather than concentrating on which boroughs were included in the different spheres of influence. Most referred to the number of boroughs served by the two malls, although many gave the wrong figures, e.g. there are nine boroughs where no-one went to Norte instead of 10. Better candidates referred to the different extent of the spheres of influence stating that '*people travelled from the whole area of Rio to Barra but only from the east side to Norte*'. In contrast, weak responses merely said that '*Barra served a larger area'*, thus repeating the question. Some candidates gave borough numbers from the key rather than naming the boroughs, which was not accepted. A few candidates attempted to compare the extent of the spheres of influence by using the scale, with mixed success.

(d)(i) 4 per cent of candidates did not attempt the question; however, most attempts were accurate. Some candidates reversed the segments and did not follow the key or the Norte graph to plot from the bottom of the bar. A few candidates drew lines without rulers which were not sufficiently accurate. A number reversed the diagonal shading, which was not accepted.

(ii) Most candidates correctly disagreed with the hypothesis, and many went on to support their decision with appropriate statements about the relative similarity of the percentages of goods purchased at each centre, especially clothing and shoes and electrical products. Some candidates wrongly saw the small differences in percentages between the two centres (2 per cent or less) as a reason to accept, or partially accept, the hypothesis. Those who did reject the hypothesis gave comparative data. However, some candidates used data in standalone comments rather than using it to support a statement. These candidates did not gain the data mark.

(iii) Candidates suggested a variety of reasons why people go to shopping centres to purchase high-order goods. The ideas of greater variety or choice, cheaper price, and that these goods cannot be bought locally were common correct responses. Also, many candidates suggested that goods bought in a shop in a shopping centre were less likely to be fakes. Reference to the quality of goods being better at these malls or there being greater quantity of them were not accepted.

(e)(i) There was an omission rate of 4 per cent. Many candidates correctly completed the pie graph with the dividing line being accurate or within tolerance, the two segments in the correct order and appropriate shading. Some candidates plotted the segments in the wrong order, not following the key and the Norte graph. Therefore, they scored one mark if the shading was accurate. A few did not gain the mark for shading as the segments were carelessly shaded, particularly the diagonal shading.

(ii) Most candidates correctly interpreted the data and scored two marks. Some candidates only stated percentages, ignoring the instruction '*do not use statistics in your answer*'. Also, some weaker responses only referred to one shopping centre and did not make the required comparison.

(iii) This question achieved a spread of marks. Many good candidates made three suitable suggestions. Popular suggestions included travelling distance to the shopping centre, the availability of a particular form of public transport such as the subway, availability of car parking spaces, whether individuals owned a car, and possible traffic congestion. Weaker responses referred vaguely to the '*cost of transport*' or gave generic answers such as '*how much it costs to get to the shopping centre*'.