

GEOGRAPHY

<p>Paper 0460/11 Geographical Themes</p>
--

Key messages

To perform well on this style of paper candidates should:

- Follow the examination rubric correctly, answering three questions, one from each section.
- Choose their three questions with care after reading them all through and studying the resources provided with each one.
- Attempt all parts of their chosen questions, making sure that no sub-sections are omitted.
- Read questions with care, underlining key words such as command words and words that indicate the context of the question.
- Know how to respond to command words used in questions – for example, ‘describe’; ‘identify’; ‘explain’ and ‘compare’.
- Identify the correct focus specified in the question – e.g., causes or impacts; problems or benefits; people or natural environment; local or global.
- Learn the meanings of geographical words and phrases to define or accurately use them. When defining terms, candidates should not repeat a word or words as part of their definition but use alternative wording to show their understanding.
- Consider the mark allocations and answer space provided in the question-and-answer booklet to write answers that contain the appropriate detail and number of points.
- Write as precisely as possible to avoid making vague or general statements.
- Give full answers wherever possible, especially in the final two parts of each question, developing ideas as appropriate to the question rather than just including general information about the topic being tested.
- Be confident in using graphs, data tables, photographs, written text, diagrams and maps of various types. Completion of graphs and maps should be carried out with care using a ruler and sharp pencil.
- Refer to source materials used in the resources to support ideas rather than directly lifting material from them without any interpretation, making sure that evidence from data is given only where required to support an answer.
- Make accurate use of the information provided, such as the compass, scale and key on maps.
- Practise the skill of describing the features or characteristics from a photograph.
- Base their answer only on the information in each figure if the rubric of a question instructs them to do so, for example by the use of the command ‘identify from Fig. X’.
- Learn case studies for each topic so that appropriate ones can be chosen for each question attempted.
- Include place-specific information in answers to case study questions but avoid writing a long general introduction at the expense of answering the question in detail.
- Use comparative language and phrases where a question requires comparison or identifying differences.
- Have a clear knowledge of physical processes and be able to explain a process, using labelled diagram(s), geographical terms and clearly sequenced ideas.
- If using the extra pages at the back of the question-and-answer booklet, indicate that the answer is continued and clearly show the number of the question on the extra page.

General comments

The most able candidates performed well across the paper and several excellent scripts were seen. Most candidates were able to make a genuine attempt at their chosen questions and where performance was weak it tended to occur when candidates found it difficult to interpret questions. All candidates seemed to have sufficient time to complete the paper, but the final parts of questions requiring extended answers were sometimes not attempted and/or lacked appropriate detail. The presentation of answers from candidates was

variable, though almost all were legible. Most candidates followed the rubric by selecting a question from each section as required. However, there were cases of candidates making rubric errors. These varied from candidates who made minor incursions into the second question of a section, through those who attempted half or more of a question before deciding to change their mind, to those who did two questions from one section and only one other so that their lower-scoring option would simply not be counted into the final mark. A small minority attempted most or even all six questions. This was poor examination strategy, since their answers were consequently extremely brief, often single ideas, which were frequently irrelevant since little or no time had been given to reading and understanding the requirements of the question. Since every question has the same structure, with increasing marks available in **(b)** and **(c)**, candidates should be encouraged to look first at these parts, and the degree to which they think they understand the tasks, before making their choice.

Questions 1, 4 and 6 were the most popular questions. There were many good answers to most questions, including those requiring extended writing, particularly to the part **(c)** questions on the impacts of deforestation on the local natural environment within a tropical rainforest or describing the benefits of tourism for local people. Many candidates included unnecessary detail in some questions, especially case study questions. This often consisted of a general introduction with irrelevant information about the topic being tested (e.g., the impacts of urban sprawl, when the question asks for descriptions of the problems). Such superfluous detail is not helpful as it is sometimes included at the expense of relevant information and development. The strongest case study answers were from those candidates who wrote with a clear focus on the question, developing or linking ideas and including place-specific information. Weaker responses typically had little focus, with brief lists of simple points (sometimes in bullet point form) not all of which were relevant.

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

Comments on specific questions

Question 1

- (a) (i)** There were many correct answers at 39. Those who answered incorrectly most commonly gave 40.
- (ii)** Many answers scored two marks with accurate plots and shading. Some plotted as 60 rather than 75, not understanding the cumulative nature of the graph. Sometimes this presented problems at the top of the graph where shading was not fully completed. In addition, some candidates shaded very untidily to the extent that the fully shaded area representing 65+ was nothing more than scribble. Candidates should complete graphs and diagrams with care, and this includes plotting and shading.
- (iii)** Few candidates scored the full three marks as their description of trends in most answers the dates quoted, and/or supporting data were not sufficiently accurate. In addition, some candidates simply quoted statistics without describing changes. Data should only have been used to support statements.
- (iv)** Lots of good answers were seen, referring to death rates, life expectancy and the factors affecting them, as listed in the mark scheme. While the fact that birth rates have decreased was a relevant point, some candidates focused entirely on the reasons for that, rather than referring in any way to people over 65. Another error was to focus on migration, which was not relevant in the context of the question.
- (b) (i)** This was usually quite well answered and, providing they wrote about the actual structure rather than the shape, answers tended to score at least two marks with correct references to both young and old dependents. The economically active population was more challenging, and some candidates did recognise the contrast between the younger and older economically active. Quite a few candidates wrongly stated that there were more economically active in rural areas. Having previously stated that there were more young and old dependents in rural areas this would be mathematically impossible as the data is in percentages.
- (ii)** This elicited a wide range of responses in terms of quality and detail. Lots of the ideas given in the mark scheme were seen, the lack of workers and the cost of caring for the elderly perhaps being the most common. Common errors included inappropriate sweeping statements about the impact of the elderly on development and the Chinese economy, along with reference to issues caused by

population growth in general (pressure on food, housing etc.). Reference to strategies to deal with the problems were sometimes included but not relevant.

- (c) Australia and Canada were often used as case studies here, sometimes to good effect as candidates could write in some detail about climate and relief, though commonly only one or two relevant developed ideas were seen. A few also referred to access but little was included in relation to resource availability. In effect many answers referred to nothing more than the reasons for low population density. It is a common misunderstanding that the two are identical and only a few candidates showed any understanding that underpopulation represents the balance between population and resource availability. Another common error was to focus largely, and sometimes entirely, on reasons why birth rates are low, which in an underpopulation question are irrelevant many overpopulated MEDCs have low birth rates/natural growth rates.

Question 2

- (a) (i) This was usually correctly answered. A few cases of 'retailing' were seen.
- (ii) Many candidates managed to score at least one mark by observing businesses along the roadside as a similarity and/or commenting on the height/size as a difference. However, not all candidates spotted these seemingly obvious points and there were a fair number of strange and obscure comparisons.
- (iii) This produced a variety of responses, that were not high scoring overall. The common correct ideas were the narrow roads, lack of traffic control and large number of car users, but all other mark scheme ideas were seen.
- (iv) Again, responses were varied, but overall quality of answers was slightly better than for the previous question, with most candidates scoring something and some mentioning a good few mark scheme ideas, with noise, delay and atmospheric pollution being the most common.
- (b) (i) On the whole responses were low scoring. Distribution words like 'uneven', 'clustered' and 'widespread' were not often seen, the most common valid responses being the ideas of distance from the CBD and the ring idea. Providing they were expressed with clarity they scored marks, but many were vague and/or simply inaccurate.
- (ii) Relatively few good responses were seen that showed good understanding in the reasons for their choice and rejection of the different strategies. All three strategies were seen as the chosen ones. Justification tended to be simplistic, revolving around pollution and access issues. There were many mentions of cost, but none were worthy of credit as it was not possible to claim that any one of these was cheaper or more expensive than the others.
- (c) Many different urban areas were chosen as case studies but were not all valid as some struggled to name an urban area, naming a country instead. Better answers gave detail about the impacts of urban sprawl on people and the natural environment, developing or linking several valid ideas. Many of the lower scoring responses referred to general problems in urban areas rather than those parts of them affected by sprawl, i.e., the rural-urban fringe. Place-specific information was almost totally absent, even from the better answers.

Question 3

- (a) (i) There were very few correct answers to this, even though it is a simple definition which all candidates should be familiar with.
- (ii) Performance on this was more secure.
- (iii) Some answers were way off target here, referring to other processes such as infiltration and percolation rather than overland flow, usually to explain why overland flow occurs rather than why it results in flooding. Some at least referred to overland flow raising river levels as it ultimately reaches the channels, though few referred to it moving quickly and taking sediment overland with it to worsen flooding.
- (iv) Most candidates successfully answered one or both parts of this question, if only with simple ideas to score one mark for each. Better answers attempted to develop their responses, but relatively few

gave convincing explanations to score two marks on each section. The best answers made a clear link with flooding, e.g. reservoirs store water (1) so that the discharge of the river is reduced, and flooding will not occur (2), trees use the water transpiring it from their leaves (1) so that it is lost to the atmosphere and does not reach the river and cause it to flood (2). Many of the weaker answers missed the flooding link, despite it being the focus of the question.

- (b)(i)** The task here was to describe the valley and many candidates wrote about the river and the landscape in general rather than focusing specifically on the valley. For example, there were many references to the meandering river, the vegetation, and the mountains in the background which were not relevant. To describe a valley effectively, candidates should refer to its shape, the valley floor and its sides, and if appropriate its long profile. In this case the valley was clearly U-shaped (not V-shaped as some suggested), with steep sides some distance from the river and a flat/gently sloping floor or flood plain. These features were very clearly shown in the image, but few described them with any degree of clarity. Statements such as 'it is flat' or 'it is steep' are not adequate description at this level.
- (ii)** The best answers demonstrated good knowledge and understanding of hydraulic action, abrasion and corrosion/solution, using one or more of the terms and clearly explaining them. At the opposite end of the spectrum the weakest answers just wrote about the river wearing away the land and others wrote about methods of transportation. These processes are key terms flagged in the syllabus and should be known by candidates.
- (c)** Some excellent responses explained the processes fully and clearly, supporting their answers with clear labelled diagrams. The key to a good explanation was the correct reference to the erosion of hard and soft rock, but some weaker answers made no reference to this (or confused it) and showed very little if any understanding.

Question 4

- (a)(i)** There were mainly correct plots.
- (ii)** Many got this right and were obviously familiar with working out temperature range.
- (iii)** Most scored little or nothing on this. The most common response related to the large difference between day and night temperatures, but many candidates did not go beyond that statement and suggest reasons for the large range as required. The few who mentioned lack of cloud tended to go on and gain further marks as a result. Few candidates even attempted to explain annual differences in temperature, and references to the seasonal variation in sunshine angle were hardly ever seen. More common were the weak responses which focused on rainfall not temperature.
- (iv)** Only a minority of well-prepared candidates did well here. Those who did gain marks tended to do so by referring to lack of water bodies and little evaporation/transpiration. Occasionally high pressure, dry winds and rain shadows were mentioned. Far more prevalent were answers which simply referred to lack of clouds and vegetation, and there were many omissions.
- (b)(i)** This was well answered by many candidates who used the resource well to compare things like the roots, the height of the plants and features such as leaves, spines, branches and stems. Scores tended to be high.
- (ii)** Overall, responses to this were strong, with some understanding shown by most candidates. All mark scheme ideas were seen – most commonly reference to the roots, spines and skin, triggered perhaps by the diagrams in Fig. 4.2. A common error in the weaker answers was to make generic references to plants being able to survive without water, without explaining how they can do that.
- (c)** Good responses were seen from many candidates, although little place-specific information was seen. Many were familiar with South and Central American examples, and several Brazilian and Peruvian rainforests were used well as case studies here. All mark scheme content ideas were seen, especially reference to wildlife, habitats, extinction etc., along with soil erosion/leaching, flooding etc. Only a relatively small number made the mistake of writing about people or the global natural environment, the latter being the most common error. The inclusion of surplus and irrelevant information was an issue as it sometimes is with case studies of this type. Long introductions, including reasons for deforestation, were frequently seen, but these gained no credit.

Question 5

- (a) (i) Many candidates got this right.
- (ii) Most candidates scored one or both marks here. Possibly errors in the second example may have been because of candidates mixing up east and west, but most used the key well.
- (iii) Many candidates did not appear to have the knowledge required to answer this question. Life expectancy was the most common correct answer; GNI and years of schooling were seen only occasionally. Many candidates simply guessed and used a variety of incorrect indicators of development.
- (iv) All mark scheme ideas were seen in answers. Good responses either referred directly to variation in the factors used to calculate HDI or more commonly they referred to relevant wider issues such as health care, education and resource availability. Weaker responses tended to revolve around the 'infrastructure', wealth and unemployment but were often too vague to earn much credit.
- (b) (i) Correct responses scoring more than one mark were unusual. Fig. 5.2 was not well used by many candidates who simply ignored its content and wrote generally about inequalities in LEDC cities. The image showed clear evidence of inequalities in housing, water supply and sanitation yet few referred to the evidence as the question required.
- (ii) In contrast this was generally well answered, and many scored high marks by referring to a range of appropriate advantages and disadvantages of TNCs for people who live in cities such as Mumbai. References to employment, both positive and negative, were included by most candidates.
- (c) Almost all candidates selected an appropriate example of a TNC but many answers to this case study remained within Level 1 with a limited number of brief statements describing the features of the chosen TNC as listed in the content guide. Many responses did little more than briefly refer to the products and location. Better responses tried to develop some of their points, for example about the labour supply in areas where outlets or factories were located, but few did this throughout their answer and high-end Level 2 and Level 3 answers were rarely seen. Those who did go into detail tended to follow the theme of the previous question by repeating irrelevant detail about the advantages and disadvantages of their chosen TNC rather than developing the points made about their features and global links.

Question 6

- (a) (i) All answers were seen. The correct answer was the most popular one.
- (ii) There were correct answers in one or both parts from many candidates. There were some slight under- or over-estimates of distance, but most were close. A few gave bearings rather than distances, but many were correct.
- (iii) This was well answered overall, and many candidates scored two or three marks.
- (iv) There were many high scoring answers. All mark scheme ideas were seen, especially reference to noise, air pollution, litter and the loss of land used by local people. However, some responses made the error of focusing on the natural environment without referring to the Kenyan people and there were generalised references to crime and 'overcrowding'.
- (b) (i) This was well answered by the bulk of candidates. Many described the location of the three national parks by using direction, distances or referring to other features.
- (ii) This produced some perceptive answers from well-prepared candidates. All mark scheme points were seen, particularly those referring to conservation of flora and fauna and restricting visitor access. Rangers, education and fines were also frequently mentioned, though not always with sufficient clarity and detail for credit. Weaker responses tended to just mention one or two ideas, in contrast with the higher scoring answers which included more detail and developed ideas.

- (c) A variety of case studies were seen, with plenty of South and Central American or Caribbean examples relevant to this cohort, some with place-specific information. In addition, textbook examples were used, such as Mediterranean tourist hotspots. Many used their example to good effect as well prepared candidates could show detailed knowledge of a variety of benefits of tourism – many referring to employment and business opportunities, along with various specific infrastructural developments. Weaker responses tended to list simple ideas, thus scoring at Level 1, rather than attempting to explain more fully. Others included irrelevant detail, such as the attractions of the chosen area, rather than focusing fully on what the question asked.

GEOGRAPHY

<p>Paper 0460/12 Geographical Themes 12</p>

Key messages

To perform well on this style of paper candidates should:

- Follow the examination rubric correctly, answering three questions, one from each section.
- Choose their three questions with care after reading them all through and studying the resources provided with each one.
- Attempt all parts of their chosen questions making sure that no sub-sections are omitted.
- Read questions with care, underlining key words such as command words and words that indicate the context of the question.
- Know how to respond to command words used in questions – e.g. ‘describe’; ‘identify’; ‘explain’ and ‘compare’.
- Identify the correct focus specified in the question – e.g. causes or impacts; problems or benefits; people or natural environment; local or global.
- Learn the meanings of geographical words and phrases to define or accurately use them. When defining terms, candidates should not repeat a word or words as part of their definition but use alternative wording to show their understanding.
- Consider the mark allocations and answer spaces provided in the question-and-answer booklet to write answers that contain the appropriate detail and number of points.
- Write as precisely as possible to avoid making vague or general statements.
- Give full answers wherever possible, especially in the final two parts of each question, developing ideas as appropriate to the question rather than just including general information about the topic being tested.
- Be confident in using graphs, data tables, photographs, written text, diagrams and maps of various types. Completion of graphs and maps should be carried out with care using a ruler and sharp pencil.
- Refer to source materials used in the resources to support ideas rather than directly lifting material from them without any interpretation, making sure that evidence from data is given only where required to support an answer.
- Make accurate use of the information provided, such as the compass, scale and key on maps.
- Practise the skill of describing the features or characteristics from a photograph.
- Base their answer only on the information in a given figure if the rubric of a question instructs them to do so, e.g. by the use of the command ‘identify from Fig. X’.
- Learn case studies for each topic so that appropriate ones can be chosen for each question attempted.
- Include place-specific information in answers to case study questions but avoid writing a long general introduction at the expense of answering the question in detail.
- Use comparative language and phrases where a question requires comparison or identifying differences.
- Have a clear knowledge of physical processes and be able to explain a process, using labelled diagram(s), geographical terms and clearly sequenced ideas.
- If using the extra pages at the back of the question-and-answer booklet, indicate that the answer is continued and clearly show the number of the question on the extra page.

General comments

The most able candidates performed well across the paper and several excellent scripts were seen. Most candidates were able to make a genuine attempt at their chosen questions and where performance was weak it tended to occur when candidates found it difficult to interpret questions. All candidates seemed to have sufficient time to complete the paper, but the final parts of questions requiring extended answers were sometimes not attempted and/or lacked appropriate detail. The presentation of answers from candidates was

variable, though almost all were legible. Most candidates followed the rubric by selecting a question from each section as required. However, there were cases of candidates making rubric errors. These varied from candidates who made minor incursions into the second question of a section, through those who attempted half or more of a question before deciding to change their mind, to those who did two questions from one section and only one other so that their lower-scoring option would simply not be counted into the final mark. A small minority attempted most or even all six questions. This was poor examination strategy, since their answers were consequently extremely brief, often single ideas, which were frequently irrelevant since little or no time had been given to reading and understanding the requirements of the question. Since every question has the same structure, with increasing marks available in **(b)** and **(c)**, candidates should perhaps be encouraged to look first at these parts, and the degree to which they think they understand the tasks, before making their choice.

Questions 1, 4 and 5 were the most popular questions, but there were good answers seen to all questions, including those requiring extended writing such as the case studies. High quality answers in these case studies included developed ideas with place-specific information, while weaker responses tended to be generic developments of ideas with little place detail to support them. Other weaker responses were characterised by the use of simple, brief statements and/or the inclusion of information, which was not relevant to the question, for example long introductions which simply set the scene rather than answering the question.

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

Comments on specific questions

Question 1

Over three quarters of the candidates answered this question.

- (a) (i)** This was generally well answered. Most candidates identified Tunisia, but a significant minority chose France. This must have been due to their not reading the question properly and focusing on the words 'most sparsely' so looking for the highest figure for either population or density.
- (ii)** This was generally well answered. There were very few errors, particularly in the calculation, which presented no problem in general. A handful did not gain the second mark due to incorrect rounding to 109.5. Occasionally candidates used the wrong formula for their calculation.
- (iii)** A common error was to simply refer to the reasons for sparse population in a mountainous area rather than addressing the question, which asked why the distribution of population was uneven in such areas. Most candidates did express the idea of variation, even if in the simplest way. In general, responses focused on relief and the idea that people will live on lower/flatter land. In many cases this was the only point made, but a significant number went on to refer to the fact that people will live near roads within the area and/or where farming was possible, such as along the valleys.
- (iv)** There was a wide variety in candidate response with the most perceptive answers achieving all four marks while others made only limited points. Some referred simply to what they could see in the photograph, such as the relief/rocky terrain, but better answers added relevant ideas such as the aridity, isolation and the difficulty of producing or obtaining food or work. A common error was to refer to the temperatures without any qualification; another was to focus on the word 'attractive', interpreting this literally rather than explaining why it was not attractive to live there.
- (b) (i)** This was generally well answered, with many candidates referring to tourism (for job and business opportunities), fishing, trade/port/transport and the flat land. Lower scoring responses focused on the perceived advantages of living by the sea, such as the scenery, the leisure activities and the beaches. Many were not helped by the misconception that the sea provides a water source or can be used for hydroelectric power. Some candidates understood that the sea has a moderating influence on the climate, but others struggled to express the idea, making simplistic comments about it being hot, or cool which could not gain credit.
- (ii)** This was generally well answered, with many candidates scoring high marks for making a variety of points, some of which were developed effectively. For example, they referred to 'the spread of disease', rather than vaguely referring to 'disease'. Development of this point often included reference to sanitation and hygiene and/or quoted examples such as cholera, typhoid and Covid.

The minority of candidates who did not respond well made vague points, such as overcrowding, traffic, service provision, resources, and litter, and made unqualified reference to pollution which is never worthy of credit.

- (c) This produced many excellent responses. The overwhelming majority of candidates chose the China One Child Policy and there were some responses which achieved full marks by referring in detail and precision to incentives, penalties and methods of enforcement, along with exceptions. Some only wrote in detail about one element of the policy (e.g. incentives or punishments). Others wrote detailed responses, but they did not describe the policy, instead focusing on its impacts, which were not relevant. Lower scoring responses focused only on extreme ideas and those providing them seemed unaware of the true nature of the policy.

Many candidates wrote extensive and irrelevant preambles at the beginning of their responses. These typically went into detail about the problem of overpopulation in China that led to the bringing in of the policy. Indeed, some responses got not much further than this and did not describe it as required.

Those candidates who chose to describe the 'Code de la Famille' in France's pro-natalist policy tended to score high marks as their answers contained accurate and well-focused descriptions.

By contrast, there were some answers about Italy, Russia or Singapore, most of which were brief and simplistic and tended to be low scoring.

Question 2

Less than a fifth of candidates answered this question and some made rubric errors.

- (a) (i) This question was answered correctly by most candidates. The most common incorrect answer was migration.
- (ii) While some candidates put all three countries in the correct order to score both marks, a significant number achieved only one mark for positioning Ghana correctly but putting Peru and Germany in the incorrect order.
- (iii) A significant number of candidates did not understand the idea of the relationship between the variables plotted on the scatter graph, but others did achieve at least one mark for this question for either identifying the positive relationship or referring correctly to this by reference to continents. Some referred to countries instead of continents. Very few included a reference to the strength of the relationship or anomalies.
- (iv) Most candidates referred to urban pull factors with jobs, education, health facilities, water supply and food supply being the most common. While in general the question was fairly well answered, a few answers did not gain credit as they were vague, referring to better services, quality of life and resources. Others wrote about the reasons for natural population growth in LEDCs rather than the increase in the percentage living in urban areas.
- (b) (i) While there were a few answers which interpreted the line graph well, using data to support the points they made, many others did not do so. Many candidates were able to identify when there had been an increase, but the question asked about 'changes in the rate of increase'. 'Increase' without qualification was not sufficient, and only the most perceptive answers referred to slow or rapid increases between certain dates, for example. Many candidates included statistics, but often they were not accurate; even when they were, they needed to support relevant statements to be worthy of credit.
- (ii) This question was not well answered in general. Those who did score some marks typically referred to reasons why farmers may remain in rural areas, with the success of investment in fertilisers, seeds and machinery resulting in increased food supplies being the most common focus. Very few added any balance to their answer by referring to factors which may still 'pull' people to urban areas despite the availability of the low-cost loans. Indeed, a significant number of candidates missed the point entirely by either suggesting that because the loans were 'low-cost' they would be inadequate or writing about how the loans might impact natural population growth in the cities.

- (c) Many answers focused on housing but included limited detail, merely stating ideas such as new houses having been built, water pipes installed etc. without any further development, therefore achieving scores within Level 1. A common error was to refer to job creation but without specific reference to an appropriate job. Candidates achieving Level 2 were able to develop their points by explaining how the attempts at improvement had helped improve the lives of people in squatter settlements. Many candidates named a country as their example rather than a named urban area. Common valid examples were Indian cities such as Mumbai, African cities such as Lagos, and South American cities such as Lima or Rio de Janeiro. Even when correct examples were used it was rare to see place-specific detail.

Question 3

This was a less popular question than **Question 4**, with approximately one quarter of candidates attempting it. Overall performance on it was not as strong as on **Question 4**, but there were a small number of excellent answers seen.

- (a) (i) This was well answered, with almost all candidates choosing the correct single option which showed understanding that a sea wall is a form of coastal protection and that the diagram featured a clifftop house that would be under threat if it had not been built.
- (ii) Many candidates seemed to struggle to identify and adequately explain the erosional risk factors either labelled or implied in the top diagram. Those who simply lifted the label 'clay cliffs' often did not explain that clay is a weak/soft/less resistant rock. Some were able to suggest valid ideas about the erosive power of storm waves or that they were destructive. There were very few mentions of the lack of vegetation cover on cliffs that would be regularly slumping as it was undercut at the bottom. Few mentioned the absence of a protective wall.
- (iii) Many did not focus on the requirement to write about how the sea wall would impact *the beach* (emphasised on the question paper). The lowest scoring answers simply explained how a sea wall would function in blocking/reflecting wave energy so that the cliff would not erode and the house would be safe with no link to the beach in front of the wall. Perceptive candidates, however, were able to understand that the protection of these cliffs would reduce material being added to the beach so the beach would become narrower. Those who knew about curved sea walls refracting the wave energy back to the beach were able to explain that this might lead to more scouring by backwash. There were many answers about the aesthetics of sea walls and their impact on access, but these had no relevance to a question about changes to the beach itself.
- (iv) Many candidates were able to correctly identify that groynes stop the process of longshore drift and that rock armour absorbs wave energy. The best answers were able to adequately link these basic ideas to how these methods of protection would reduce erosion by creating a wider beach that would make waves break further from the cliffs and result in less erosion/undercutting of the sea wall respectively.
- (b) (i) The question had two very different and clear photos of bays, yet many focused almost exclusively on the headlands and cliffs rather than the bays and their beaches, which was irrelevant to a question solely about bays. A few did not identify which image their points referred to, saying 'one is.... the other is....', and a significant number of answers did not make comparative points. Answers which scored well compared the dimensions of the bays, identifying that Fig. 3.2 is much wider but less deep/long than Fig. 3.3, and that the material of the bay shown in Fig. 3.2 is white/grey and likely to be rocks/pebbles as opposed to Fig. 3.3's expanses of sand.
- (ii) Many candidates understood that bays and headlands are the result of hard and soft rocks outcropping along a coast. Some were able to refer clearly and accurately to their different levels of resistance to erosion, using the idea of discordancy well to gain full marks. Lower scoring answers showed awareness that bays and headlands are the result of erosion, but did not develop this. Some guessed, referring to irrelevant processes such as longshore drift.
- (c) This question was often answered very well with clearly developed ideas showing the sequence of erosional processes – such as hydraulic action and abrasion/corrasion causing changes from an initial crack or fault on a hard rock headland enlarging into a cave, the cave being eroded completely through the headland to form an arch, and the final collapse of the unsupported and weathered arch to leave a stack – with a clear and labelled sketch/diagram to achieve full marks. Lower scoring answers simply stated that a crack becomes a cave which becomes an arch, which

ends up as a stack. Some took the sequence a step further than the requirement of the question in explaining how a stack could be undercut and collapse to form a stump; this was irrelevant and took up time that could have better been spent elsewhere.

Question 4

This question was chosen by approximately three quarters of candidates. Overall performance on the question was stronger than that on **Question 3**.

- (a) (i) The questions on weather instruments and the recording of weather were generally approached with confidence. Most candidates correctly identified the Stevenson Screen.
- (ii) Most candidates were able to successfully identify two weather instruments kept inside the Stevenson screen. The most common incorrect responses were the anemometer and the sunshine recorder.
- (iii) Most candidates were confident in identifying three factors present when selecting the ideal site for the Stevenson Screen, with many describing more than the three required points. The most common responses were 'away from trees and buildings/in an open area' and 'in a fenced/secure area'.
- (iv) In discussing different design attributes of the Stevenson Screen, there was a significant variation in both accuracy and the level of detail provided for the four identified aspects. The most consistent responses in terms of accuracy were based on the screen having slatted sides and having legs one metre in length, with appropriate comments on air circulation and avoiding recording air temperature at ground level. Although many candidates could explain why the screen was constructed of wood and had a double roof, there was some confusion between conduction and insulation. Most responses did not include this vocabulary, with weaker responses using vague statements such as 'does not get hot'. Common errors included reference to wood being more durable than other materials/not rusting, the double roof protecting the equipment from 'the weather' or rain and the legs avoiding splashes from the rain and interference from animals.
- (b) (i) Although most candidates identified at least one difference between the two photographs of clouds, it was apparent that in general they were less confident in responding to this question than those relating to weather instruments. Common answers referred to differences in the density, coverage and likelihood of rain. Some correctly identified the different cloud types by name. As with **3(b)(i)**, a few did not identify which image their points referred to, saying 'one is.... the other is....', and a significant number of responses related to only one photograph and did not make comparative points.
- (ii) Many candidates identified a standard measuring schedule (usually daily and at the same time each day) and referred to placing the rain gauge in a suitable specified location. However, in discussing the process of measuring precipitation, they were much less precise. Although there was occasional mention of a measuring cylinder or melting snow before measuring precipitation, very few explained how to measure the precipitation. Many candidates wrote long, convoluted answers that were devoid of relevant points, including surplus or inaccurate detail such as recording the data in a table, dividing the whole month by the number of days, only measuring it when it rained, being careful not to spill the water, etc. So, while they were lengthy, such answers were low scoring.
- (c) This was well answered by many candidates and there were strong Level 3 answers which included place-specific information. The Ganges, Indus, Nile, Mississippi, Elbe and Zambezi were popular choices. Good responses explained in detail, developing several ideas, typically excessive rainfall, deforestation and urban development. Weaker answers simply listed reasons or wrote in vague terms such as 'The flood was caused by the river having too much water in it'. Many wrote about the effects of floods rather than or in addition to their causes. This simply wasted their time when they could have been developing their points about the causes of the flood to score higher marks.

Question 5

This question was slightly more popular than **Question 6**. Overall performance was very similar on the two questions.

- (a) (i) The majority of candidates answered this question correctly as Africa. A small but significant number incorrectly mentioned names of countries, the most common being Somalia.
- (ii) Most candidates correctly expressed the idea as the difference between a general lack of food (starvation), compared to the presence of food but an imbalance or lack of nutrients (malnutrition). Some candidates wrote about the 'hunger' of the people in the context of starvation, which was not sufficient for credit.
- (iii) Most candidates used the key to the map to answer correctly and score full marks.
- (iv) Very few candidates earned more than half marks on this question. Many were able to identify that the lack of rainfall in a drought would cause the crops to die, and some also identified the consequences this would have on animals, whose meat is another source of food, and whose death would lead to food shortages. The direct point of there being a lack of water and thus no water being available for irrigation was also mentioned by some candidates. Only the most perceptive referred to the fact that drought would cause food prices to rise. Similarly, the impact on farmers was mentioned by such candidates who were able to explain that they would have to spend more time fetching water, thus limiting their available time for cultivation, as well as the possible illness, dehydration and death of the farmers – all of which would cause further shortages of food in the longer term. A common error was to describe what drought is, or its impacts on society at large, rather than focusing on food shortages. Indeed, there were some who did not appear to know the meaning of drought and instead wrote about the impacts of heavy rainfall or pests.
- (b) (i) Most candidates gained at least one mark for stating that the expense of importing crops by an LEDC was unsustainable, seeing as the country was likely to be lacking the necessary funds. A significant number of candidates identified that this would result in debt and/or being dependent on another for its subsistence, especially because in cases of crisis such as war, the imports may suddenly stop. A very large number of answers spoke of the food being inedible by the time it arrived, which was not a valid point. Others commented on the potential environmental issues resulting from transportation of large amounts of food products over long distances which was worthy of credit, given the reference to sustainability in the question.
- (ii) There were many perceptive responses. All three methods were chosen and justified by many candidates, though methods B and C were the most popular. Whatever their choice of method, weaker responses tended to just mention one or two ideas either for the chosen method or against those rejected, in contrast with the higher scoring candidates who included more detail, in some cases developing their ideas. Not all candidates read the question carefully, so they did not write about the disadvantages of the two methods rejected, limiting their marks. Others wrote instead about the disadvantages of the method which they had chosen, which were irrelevant. Some answers displayed impressive environmental awareness, as shown in their rejection of Methods B and D. The points that many made about the impacts of loss of forest and use of fertilisers on the natural environment were particularly relevant when sustainability was being considered.
- (c) The highest scoring answers tended to focus on distinct areas such as the Ganges Valley or specific farms, probably local ones known to the candidates. The question asked candidates to describe *and* explain the agricultural land use of their chosen farm or area. Some candidates did not name a specific farm or area and referred to farming in general or in a named country, producing limited responses accordingly. A lot of descriptive answers were given, listing the crops grown or animals kept, but without explanation as to why the area was particularly suitable for this land use. Such answers were restricted to Level 1. Only answers which explained the land use by reference to the climate, water sources, relief, demand or soil type, for example, could potentially bring a response into Level 2 and beyond. As with other case study answers, many responses introduced irrelevant background detail, such as long descriptions of processes of how cows are milked or fruits processed into a commercial product. Candidates need to read each question with care, so they do not overlook the key information needed and do not waste time including irrelevant information.

Question 6

This question was slightly less popular than **Question 5**, but overall performance was very similar on the two questions.

- (a) (i) Most candidates were able to give an acceptable definition of a transnational corporation.
- (ii) Most candidates were able to correctly identify China and Vietnam from Fig. 6.1.
- (iii) Most candidates scored at least one mark, but few got full marks. The most common acceptable responses were that Asia had most factories and Africa/Australasia had few. Some candidates impressively used terminology associated with distribution e.g. widespread/uneven/clustered. By contrast, many low-scoring answers did little more than list countries, which is not acceptable as a description of a distribution.
- (iv) Many candidates achieved at least half marks. All mark scheme ideas were regularly seen, but the creation of work and gaining of foreign currency were the most common advantages given, with exploitation and the negative impact on local producers being the most common disadvantages. Errors frequently seen were references to the availability/cheapness of Nike shoes as an advantage and a lack of specificity when referring to pollution or infrastructural improvements.
- (b) (i) Most candidates were able to correctly identify the three terms.
- (ii) Many candidates wrote in broad terms about 'technology' rather than naming different types of technology and some wrote about technology (e.g. robotics/automation/mechanisation) without linking their ideas to its contribution to globalisation. The most common valid answers focused on the use of the internet and technological developments in the transport industry. However, there was a lot of repetition in these responses, many of which lacked the specificity required. Well thought out and detailed answers to this were in the minority.
- (c) The most impressive answers tended to focus on common textbook examples of areas such as Silicon Valley in the USA or the M4 corridor in the UK, or they used specific factories such as Toyota at Burnaston, Derby in the UK or Pipri iron and steel works in Pakistan. There were also some good answers using smaller factories or small-scale industrial areas, probably local ones known to the candidates. The question asked candidates to describe *and* explain the location of their chosen factory or industrial area. Some candidates did not name a specific factory or area and referred to industry in general or in a named country, thus producing limited responses. Others used TNCs such as McDonalds and Walmart in terms of their sales branches rather than production, missing the point of the question completely. A lot of descriptive answers were given, describing aspects of the location, but without explanation as to why the area was particularly suitable for this industry. Such answers were restricted to Level 1; only answers which explained the location of the factory by reference to, for example the availability of raw materials, transport links, energy supply and market could bring a response into Level 2 and beyond. As with other case study answers, some candidates introduced irrelevant background detail or descriptions of processes and products, a problem if this was at the expense of referring to location.

GEOGRAPHY

<p>Paper 0460/13 Geographical Themes 13</p>

Key messages

To perform well on this style of paper candidates should:

- Follow the examination rubric correctly, answering three questions, one from each section.
- Choose their three questions with care after reading them all through and studying the resources provided with each one.
- Attempt all parts of their chosen questions, making sure that no sub-sections are omitted.
- Read questions with care, underlining key words such as command words and words that indicate the context of the question.
- Know how to respond to command words used in questions – for example, ‘describe’; ‘identify’; ‘explain’ and ‘compare’.
- Identify the correct focus specified in the question – e.g., causes or impacts; problems or benefits; people or natural environment; local or global.
- Learn the meanings of geographical words and phrases to define or accurately use them. When defining terms, candidates should not repeat a word or words as part of their definition but use alternative wording to show their understanding.
- Consider the mark allocations and answer space provided in the question-and-answer booklet to write answers that contain the appropriate detail and number of points.
- Write as precisely as possible to avoid making vague or general statements.
- Give full answers wherever possible, especially in the final two parts of each question, developing ideas as appropriate to the question rather than just including general information about the topic being tested.
- Be confident in using graphs, data tables, photographs, written text, diagrams and maps of various types. Completion of graphs and maps should be carried out with care using a ruler and sharp pencil.
- Refer to source materials used in the resources to support ideas rather than directly lifting material from them without any interpretation, making sure that evidence from data is given only where required to support an answer.
- Make accurate use of the information provided, such as the compass, scale and key on maps.
- Practise the skill of describing the features or characteristics from a photograph.
- Base their answer only on the information in a given figure if the rubric of a question instructs them to do so, for example by the use of the command ‘identify from Fig. X’.
- Learn case studies for each topic so that appropriate ones can be chosen for each question attempted.
- Include place-specific information in answers to case study questions but avoid writing a long general introduction at the expense of answering the question in detail.
- Use comparative language and phrases where a question requires comparison or identifying differences.
- Have a clear knowledge of physical processes and be able to explain a process, using labelled diagram(s), geographical terms and clearly sequenced ideas.
- If using the extra pages at the back of the question-and-answer booklet, indicate that the answer is continued and clearly show the number of the question on the extra page.

General comments

The most able candidates performed well across the paper and several excellent scripts were seen. Most candidates were able to make a genuine attempt at their chosen questions and where performance was weak it tended to occur when candidates found it difficult to interpret questions. All candidates seemed to have sufficient time to complete the paper, but the final parts of questions requiring extended answers were sometimes not attempted and/or lacked appropriate detail. The presentation of answers from candidates was variable, though almost all were legible. Most candidates followed the rubric by selecting a question from

each section as required. However, there were cases of candidates making rubric errors. These varied from candidates who made minor incursions into the second question of a section, through those who attempted half or more of a question before deciding to change their mind, to those who did two questions from one section and only one other so that their lower-scoring option would simply not be counted into the final mark. A small minority attempted most or even all six questions. This was poor examination strategy, since their answers were consequently extremely brief, often single ideas, which were frequently irrelevant since little or no time had been given to reading and understanding the requirements of the question. Since every question has the same structure, with increasing marks available in **(b)** and **(c)**, candidates should be encouraged to look first at these parts, and the degree to which they think they understand the tasks, before making their choice.

Questions 1, 4 and 5 were the most popular questions. Choice of questions was much more balanced in **Section C** than it was in **Sections A and B**. There were good answers seen to all questions, including those requiring extended writing such as the case studies. High quality answers in these case studies included developed ideas, with place-specific information. Weaker responses tended to be generic developments of ideas with little place detail to support them. Other weaker responses were characterised by the use of simple, brief statements and/or the inclusion of information that was not relevant to the question, for example long introductions which simply set the scene rather than answering the question.

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

Comments on specific questions

Question 1

This was far more popular than **Question 2**, with most candidates attempting it.

- (a) (i)** Most candidates read Fig. 1.1 correctly and so identified the correct percentage. The most common error was 2.3 per cent, probably because candidates did not total the sum of both males and females aged between 40 and 44.
- (ii)** Most candidates stated that Nigeria has the highest percentage of young dependent population. However, many did not give accurate comparative statistics. The most common errors were to state statistics for individual age groups or just to consider males or females.
- (iii)** When candidates had read the question carefully and noted that they needed to describe how the shape of the pyramid is typical of an LEDC, they often made at least two valid points, most frequently referring to the wide base and the narrow top. Answers which did not focus on the shape and instead gave explanations such as high birth rates failed to gain credit here.
- (iv)** This question was answered well by many candidates and a whole range of factors were identified.
- (b) (i)** This question was well answered. Almost all candidates identified Fig. 1.3 as having the highest population density and many fully justified their choice, usually by reference to both buildings and people or cars.
- (ii)** The question required candidates to consider the impact of high population density on the provision of services. Weaker answers tended to make general points about the impacts of high population density, occasionally considering one or two services, such as healthcare. Good answers often considered the positive and negative impacts of high population density on service provision, including the availability of a wider range of named services, as well as the pressures upon them.
- (c)** Candidates offered good examples of countries, such as Australia, Canada and Namibia, and used these to good effect. Few chose a sparsely populated area, such as a named desert or highland area or, for example, Amazonia. Stronger case studies included good, developed ideas. Weaker ones offered simple lists; some just referred to one idea such as the weather and climate, or the relief of an area. Simple lists, for example, '*mountainous*', '*arid*', '*isolated*'. etc. needed to be linked with an explanation as to why this led to a sparse population. Some candidates incorrectly saw this as a migration question or an opportunity to write about why their chosen country has low birth rates. Where candidates chose countries rather than named areas within those countries there was also a tendency to consider why the population is unevenly distributed rather than explaining the areas of sparse density. Place-specific detail was absent from many answers.

Question 2

- (a) (i) This question was not well answered. Urbanisation is the increase in the proportion of people living in urban areas, **not** the process of migration which results in that growth or 'the growth of urban areas'.
- (ii) Most candidates correctly stated that the percentage is higher in 2030. Some answers also gave correct comparative statistics for both years. However, many referred only to the percentage being 81–100 per cent in 2030 and did not state that the percentage in 1990 was 61–80 per cent.
- (iii) There were some strong responses to this question, typically with reference to the uneven distribution or the fact that the cities are coastal.
- (iv) Many candidates understood this question well and recognised this as an opportunity to write about the pulls of urban areas, giving a whole range of mark scheme ideas, particularly access to jobs, healthcare and education. However, a significant number incorrectly wrote about the reasons for high birth rates or high natural population growth which was not what the question required.
- (b) (i) Stronger responses made valid and precise observations, such as the fact that the buildings in the photograph are single storey, small or tightly packed together, and are generally made of wood with metal roofs. Many weaker responses offered value judgements, suggesting that they were cramped or unstable, while others referred to features in the photographs other than the buildings, such as litter or washing lines.
- (ii) Some good responses were seen. Some explained why the strategy would be helpful, while others made the case against their success equally well, with reference to ideas such as how there would still potentially be a lack of education or healthcare in those areas. The better responses tended to explain how the strategy would help improve the quality of the buildings. Weaker responses incorrectly assumed that low-cost materials meant low quality materials, and so focused on issues such as the weakness of the buildings rather than the benefits of being provided with building materials.
- (c) This question was poorly answered overall, although some excellent responses were seen. Many different areas were chosen as case studies. However, not all were valid, as some struggled to name a rural area with many naming cities or countries. Well prepared candidates wrote about the impacts on population structure, the workforce and the economy of rural areas. Some also wrote about social impacts and the negative effect on service provision. Weak responses sometimes referred to urban areas rather than rural ones, whilst others did write about the impacts on rural areas, but typically with a limited number of simple statements. A few stronger responses gave place-specific detail.

Question 3

- (a) (i) Most candidates identified South America correctly. Africa was the most common incorrect answer.
- (ii) Many candidates correctly compared the location of the hot deserts on the tropics with the equatorial distribution of the rainforests. However fewer candidates developed their answers beyond this idea. A common error was to refer to continents or size.
- (iii) Some excellent answers were seen, with some candidates gaining full marks and most gaining at least one mark, usually for buttress roots. A common error for buttress roots was to refer to the idea of obtaining water rather than stability. In terms of drip tip leaves many answers omitted the idea of shedding water quickly. The reasons for wide leaves were often correct with reference to the need for light or sunshine; some answers incorrectly referred to the need for water.
- (iv) This question prompted some high-scoring answers with reference to appropriate characteristics and then relevant explanations. Weaker answers often did not identify a characteristic of the vegetation, instead simply stating they can survive without water, which failed to gain credit.
- (b) (i) The majority of candidates answered this question well and gave clear comparisons between the reasons for deforestation, using the words 'more' and 'less' to good effect, as statistics were not required here. Some answers correctly contrasted the main reason for each region, but then

considered the second most important and third most important, which did not offer a clear contrast and so could not gain credit.

- (ii) This question was well answered by most candidates and all mark scheme ideas were seen, especially reference to wildlife, habitats, extinction, soil erosion and flooding. Some candidates did not develop their answers fully enough. A small number made the error of writing about people or the global natural environment.
- (c) Stronger responses offered some precise, detailed or linked descriptions and explanations of features of the equatorial climate, such as the overhead sun causing the high temperatures. Weaker responses made simple reference to a limited number of features, such as hot, wet and humid, but failed to explain these factors clearly. Good answers also included accurate statistics which provided place-specific detail.

Question 4

- (a) (i) Most candidates were able to work this out correctly and gained the mark. When incorrect answers did occur, they were usually very wrong which implied that the candidate was not completely sure what diurnal range meant as it was clear that the answer was not just a simple calculation mistake.
- (ii) Many got this right and were obviously familiar with using the Relative Humidity table. Others just guessed how to work it out, and a common error was to average the dry and wet bulb temperatures.
- (ii) Many were not fully sure what is meant by relative humidity. When the term was understood two marks were achieved, but many candidates failed to gain credit.
- (iii) Most candidates understood this question well and named three weather instruments. However, it was also clear that some candidates did not fully understand that wind and rain instruments would not work in a Stevenson Screen as they would need full exposure to the elements to measure this correctly.
- (iv) The focus of the question was on the features of the Stevenson Screen itself and not the location of the Screen. Common answers included the facts that it was painted white and had legs to lift it off the ground, and correct explanations supported these descriptions. Many answers, however, referred to locational factors which was not the focus of the question.
- (b) (i) Most candidates answered this question well. However, weaker answers showed that time had not been spent reading these figures correctly to ensure that they fully understood the changes. Despite the question asking candidates not to use statistics, a few did and received no credit unless the description of increased/decreased accompanied the statistic. The wind direction mark was only given if the previous and new direction were both included. No credit was given for the fact that wind direction had 'changed'.
- (ii) Good understanding was seen here, with a range of advantages stated, most commonly reference to precision, ease of reading and the ability of the instrument to store and process data. However, full marks were rarely achieved as overlapping/equivalent ideas were often provided. It is important that candidates refer to different ideas to receive credit.
- (c) Most candidates interpreted the question correctly and chose an appropriate river. A wide range of rivers were chosen, including the Ganges and the Elbe as well as many valid local examples. The focus of the question was on the reasons for floods, which is simply the causes for the flooding. Common credit-worthy Level 1 answers included heavy rainfall, deforestation, snow melt and the increase of urban areas. Explanation was needed to move into Level 2, for example deforestation (a Level 1 statement) which resulted in more soil getting into the river and increasing the height of the riverbed (a Level 2 statement). Weaker responses misread the question and referred to the consequences of the flood which received no credit.

Question 5

- (a) (i) 650 km was the most common and correct response, but all the other options were seen. Candidates need to use the scale to accurately measure the distance on a map.

- (ii) This was well answered, with most candidates identifying that mountains or steep slopes were present as well as forests or thick vegetation. A few candidates referred to ideas from Fig. 5.2 rather than using the photograph, Fig. 5.3, and did not gain credit.
 - (iii) Candidates clearly understood this question very well and gained three marks by using the figure and recognising that the journey time would be reduced, economic development would take place and that jobs would be provided.
 - (iv) There were many high scoring answers. Candidates identified that there would be no deforestation, less air and noise pollution would occur, as well as no destruction of habitats. Four separate ideas were required here, but weaker answers were often not extensive enough, and often gave brief responses, many just mentioning habitats and impacts on wildlife such as the painted terrapin.
- (b)(i) This question was generally not well answered. Weaker answers wrote generally, and their responses could have been about any large company, for example, lots of workers, large turnover etc. Some incorrectly wrote about the advantages and/or disadvantages of transnational corporations. Common correct responses focused on the fact that they were in countries all over the world, they had headquarters in MEDCs and manufacturing in LEDCs.
- (ii) Candidates clearly knew the advantages and disadvantages of having TNCs in countries such as Malaysia. There were lots of ideas on the mark scheme which were creditworthy, and four and five marks were very common. Ideas for the advantages often included employment, skills, economic development and the idea of the building of schools and roads. Common disadvantages included the long hours and low wages, reference to a named pollution, and competition for the local industries.
- (c) This question was answered very well overall and is clearly an area of the specification that candidates were well prepared for and understood well. A wide range of economic activities were referred to, including the burning of fossil fuels, factories, grazing animals and deforestation. Explanation was then given as to how these economic activities cause global warming with reference to different gases such as carbon dioxide and methane. Weaker responses just referred to one or two activities, using brief statements without any real explanation, while some others confused global warming with ozone depletion. Some wrote generally about using cars rather than focusing on economic activities.

Question 6

- (a)(i) Candidates used the figure to good effect and most gave the correct answer here.
 - (ii) Again, the figure was read well by most candidates and was usually correctly answered.
 - (iii) This was well answered overall with most candidates recognising that Uganda had the higher percentage with safe water in cities, but Benin was the highest for towns and rural areas. Providing they wrote comparative answers, candidates tended to score full marks.
 - (iv) There were some strong responses to this question. All mark scheme ideas were seen, especially reference to reduction of water-borne disease and the impact of that on death rates, productivity and health care. Weaker responses missed the idea that water is a basic need and is required to prevent dehydration. Disease in general was often referred to rather than a correctly named specific disease and did not gain credit.
- (b)(i) This was well answered by many of the candidates. Almost all answers correctly identified or described the methods shown in the sketches, especially Figures 6.2 and 6.4. However, for Figure 6.3 on occasions there was no reference to the underground idea or aquifer, and so a mark could not be awarded.
- (ii) This question prompted a range of valid reasons, and the methods were understood. Advantages of Fig. 6.4 that were given referred to the fact that the water was clean and there were large amounts available. Disadvantages for Fig. 6.2 that were given referred to the fact that the water would not be clean or indeed would not be present if there was no rain. The queues on Fig. 6.3. were often referred to as a valid disadvantage. References to cost of the methods were not credited.

- (c) China and New Zealand were common case studies here, often used to good effect as candidates could show detailed knowledge of the importance of different methods of energy supply in some way – some by using statistics, and others by making appropriate statements. Weaker responses tended to list methods of energy supply in the country, hence scoring at Level 1, rather than attempting to describe the importance of each one. Others explained in detail why various forms of energy were used, rather than describing their importance.

GEOGRAPHY

Paper 0460/21
Geographical Skills 21

Key messages

- Paper 21 is a skills paper and candidates are required to use the resources within the questions, including maps, diagrams, graphs, tables of data and photographs.
- Candidates must read the questions carefully and identify the command word(s) in order to write what is required. For example, an answer to a question that asks candidates to *explain* should give reasons for the statements made. If a question asks for a comparison, then it is important that comparative language is used within each sentence of the response.
- Candidates should have a thorough understanding of geographical terminology and be able to use this in their answers. Language used should be precise and appropriate; vague terms such as *quality of life*, *resources* or *infrastructure* will not be credited.
- Questions relating to cross-sections are generally found more challenging. While some perform well with this skill, most candidates would benefit from further practice in identifying features marked on a cross-section and drawing their own to reinforce their understanding of relief and their ability to recognise the topography of the land.
- Many candidates do not understand the concept of an overall pattern when looking at choropleth maps. It is important that they do not look at every single aspect of the map but pick out key features, usually informed by the number of marks available.
- Candidates should not rewrite the question in their response. They should use the time and space available for the answer itself.
- If candidates are using the additional pages in the paper, they must clearly state the question number(s) for their answer(s). There is no need to repeat what has already been written in the question paper on the additional pages.
- Candidates are advised to remember the importance of legibility in presenting their answers.

General comments

On all scripts, all or the majority of questions in the paper were answered; candidates are always encouraged to at least attempt a response. There were no noticeable timing issues and almost all completed the paper. Where candidates scored lower marks, it was usually due to a lack of knowledge and understanding of some areas of the syllabus, although on occasion failing to identify the command word, misuse of geographical terminology and unclear responses contributed. In general, mapwork skills had improved in comparison with previous examination sessions, but many candidates would have benefited from further practice with grid references, cross-sections, distances and compass directions.

Comments on specific questions

Question 1

- (a) Candidates scored well on this section with clear interpretation of the map and its key. The type of road at A was *Motorway*. Feature B was a *river*. The height above sea level of the spot height at C was *54m*. Feature D was a (*deciduous*) *forest/wood*. *Mont Rouge* was also accepted as the name of the forest/wood. The land use at E was *industrial (buildings)*.
- (b) This question asked for the six-figure grid reference of the spring labelled F. Two answers were credited, *046347* or *046248*. Many candidates did not understand how to read a grid reference or had learned the incorrect technique. It is important to note the instructions on how to read grid references is in the syllabus.

- (c) While most candidates correctly identified three tourist services from *tourist information centre*, *water sports*, *bathing place* or *seaside resort/resort with tourist interest*, some selected services that were either not coastal or not present at all. Candidates must read the key alongside the map itself.
- (d) The response to the distance along the coastline between the two points in **part (i)** was 1150m. The compass direction in **part (ii)** was *south-east/south-south-east*, with the majority using the eight-point compass rather than the sixteen-point compass.
- (e) Many candidates find questions relating to cross-sections challenging, and this was no exception. The three parts had the highest no response rate on the whole paper. In **parts (i) and (ii)** candidates were asked to identify two labelled features marked on the cross-section. **Part (i)** was a *secondary road/D242* and **part (ii)** was a *signposted route of hiking*. *GR de Pays/Tour de Boulonnais/other road* were also credited as they appeared in close proximity on the map extract. Despite receiving more acceptable responses, **part (ii)** scored less highly than **part (i)**. Many candidates omitted **part (iii)**; those that attempted it had mixed results. The correct plot was 55m and any line meeting the left-hand axis between 50–59m was credited. The candidates that did gain the mark drew very accurately and it was evident that care and attention had been taken.
- (f) This was worth six marks and required extended writing. Candidates needed to use the map extract to study the settlement of Wimereux, and then describe the site and give reasons for growth. While most responses described the site, in many cases the second part of the question was not attempted with no reasons for growth offered and so it was not possible to obtain all the marks available. This highlights the importance of reading the question carefully to identify the command word(s) and develop answers where necessary. There were many site features identifiable, with the most common answer being *coastal* for *trade/fishing/tourism* which generated *jobs*. Other popular answers were the *river/wet-point site* for *water/trade/agriculture/fertile soil* and the *road/rail links* for *trade/transport/access/communication*. Stronger answers also recognised that the relief was *low* and land was *gently sloping*, both of which make *building easier* and are beneficial for *agriculture*. The *forest/wood* provides *fuel/heating/building material* and the *industry* creates *jobs*. No candidates identified the *fort* which would have been used for *defence*.

Question 2

- (a) This question was based on population density in Kenya. Candidates were required to calculate the population density in the capital city of Nairobi, having been given the data for population and land area. Most candidates knew the calculation was population divided by land area to generate an answer of 6245.8/km² to one decimal place, or 6245.84/km² to two decimal places. Where candidates chose to write the answer with no decimal places some did not round up to 6246/km² and therefore did not gain the mark.
- (b) Fig. 2.1 was a choropleth map showing the population density in Kenya, with three categories. Candidates then had to select two statements to describe the population density. The correct answers were *there is uneven population density* and *population is concentrated in the centre of Kenya*. In any question where candidates are asked to select a specific number of correct answers it is important that they do not pick more than requested.
- (c) This five-mark question required candidates to use three separate choropleth maps: Fig. 2.1 showing the population density in Kenya, Fig. 2.2 showing the relief in Kenya, and Fig. 2.3 showing climatic zones in Kenya. The question asked candidates to suggest reasons why some areas are more densely populated than others. It was usually answered at length but answers often lacked clarity of expression and became confused. In addition, many answers displayed limited ability to identify patterns. Some weaker answers stated data at random without interpreting it. Some better answers over-complicated their responses. The majority answered from the perspective of dense population although answers referring to sparse population were credited providing they did not repeat previously credited points. Many candidates were able to identify that *coastal areas are dense due to fishing/trade or tourism*. *Coastal areas for a water supply* were not correct; however, *a water supply from Lake Victoria* was fine. *Lake Victoria/Uganda for trade/communications* was also creditable although very rarely identified. Candidates could gain marks regarding the climate, such as *cool(er) temperatures/high(er) rainfall are better for farming* but *higher temperatures along the coast lead to tourism*. Few candidates correctly interpreted that *dense populations are in low(er) areas which are easier to build on/farm* or that *Nairobi would have dense populations due to employment*.

Question 3

- (a) For **part (i)** candidates were required to plot a world urban population of 56 per cent onto a bar graph. Occasionally a candidate did not realise that each square on the graph represented 2 per cent, but most gained the mark. Candidates must remember to use a ruler and HB pencil for graph work as lines drawn without a ruler are often inaccurate. **Part (ii)** required a description of the changes in urban population in three regions (Thailand, East Asia and the World) between 1990 and 2020. One mark was reserved for the use of statistics. The question was generally done very well, with the best answers saying that *all increased, Thailand went from 29–51 per cent/increased 22 per cent, East Asia went from 3–61 per cent/increased 27 per cent and the World went from 43–56 per cent/increased 13 per cent*. Candidates could also use descriptive language such as *Thailand/East Asia almost doubled or a smaller increase in the World and larger in increase in Thailand/East Asia*.
- (b) Fig. 3.2 was a photograph of an urban settlement in Thailand and candidates were asked to suggest reasons why people would migrate to such areas. It was usually answered very well, although a few candidates confused rural and urban areas and suggested urban areas were quiet, farming areas (despite the photograph). There was an abundance of possible answers with most answering from the perspective of pull factors. Push factors were also credited providing they were not repetition. *Better healthcare, education, transport, food supply, electricity/internet supply and security* were all accepted. In addition, marks were given for *employment opportunities/working conditions, higher wages, more entertainment/range of products and clean water*. Some answers were too vague, such as *better housing* which needed to be *better quality/modern housing*. As always, responses related to quality of life, resources and infrastructure were not acceptable.

Question 4

- (a) This question was about the Tōhoku earthquake in Japan. Candidates were presented with a map showing the location of the earthquake, the epicentre, the plate boundaries and direction of plate movement. **Part (i)** asked what the term *epicentre* meant. Very few knew the full and correct definition and some answers showed no understanding at all of earthquake terminology. The correct definition is *the location at the surface of the ground above the focus or origin of an earthquake*. **Part (ii)** required identification of the type of plate boundary that caused the earthquake, which was *destructive/convergent/collision*. This was answered better than **part (i)**. In **part (iii)** candidates had to explain how the type of plate boundary shown causes earthquakes, which is a standard plate tectonics question. While many used the term *subduction*, explanations of the subduction process were often incorrect, e.g. *one plate moving upwards above the other and the lighter oceanic plate sinking*. Correct answers were that *plates move towards each other, the heavier oceanic plate subducts, there is friction/the plate gets stuck, pressure builds up and is then released*.
- (b) This question asked candidates to suggest two ways that earthquakes result in the death of people. Almost all stated variations of *buildings being destroyed* (*damaged* was not accepted) and gained one mark. The second mark was a little more challenging to achieve but many referenced *tsunamis*. Also creditable were *collapse of roads/bridges/trees/power lines, fire, landslides, gas explosions* and an *inability to reach medical help*.
- (c) This question was seldom answered well, and it seemed that in general knowledge and understanding of earthquake proof buildings was limited. Candidates should be familiar with ways to reduce the impacts of earthquakes as stated in the syllabus. Fig. 4.2 was a diagram of five features that can be used in buildings that are able to withstand strong ground movements. Candidates had to select two and suggest how each reduces the impact. All but the strongest answers stated the same for each feature – that it *stops the building collapsing* – but that did not answer the question and offered no reasoning for how they work. Acceptable responses for each of the five features were – *computer-controlled weights on the roof counterbalance movement, automatic window shutters prevent falling glass, rubber shock absorbers absorb tremors, foundations sunk into bedrock provide a firm base/stop sinking/strengthen* and an *interlocking steel frame enables swaying/stabilises the building*.

Question 5

- (a) Candidates were presented with a climate graph of Manaus, Brazil, and needed to use the graph to state the average monthly rainfall in June in **part (i)** as *120 mm* and the average monthly temperature in November in **part (ii)** as *28°C*. This was usually done correctly, although there were some candidates who confused the rainfall and temperature data and therefore gained no marks. Several candidates wrote that there was no key for the graph; but climate graphs do not have a key, and candidates are expected to know how to interpret them. **Part (iii)** was not answered well, with a variety of very complex and incorrect calculations offered for the annual temperature range. The range is the simple calculation of highest temperature minus lowest temperature, in this case *28°C–27°C* to give an answer of *1°C*.
- (b) Fig. 5.2 showed a photograph of a tropical rainforest in Manaus, and candidates had to identify three features typical of a tropical rainforest. Candidates could not be credited for features that were not present in the photograph, such as *lianas*, or references to climate that could not be ascertained, such as *hot*. The most common answers were *dense* and *biodiverse*. Some candidates also identified that the area was *(ever)green*, with a *canopy layer* and *palm trees*. Few noticed the *shrubs/bushes* and almost no responses mentioned the *dark forest floor* or *thin trunks*. A large proportion said the *trees were tall* but that was too vague; not all trees were tall, so the concept of *emergents* was necessary.
- (c) This question was answered well, demonstrating secure understanding of the reasons for deforestation. Credit was given for *agriculture, cattle ranching, logging, (fuel)wood, mining, urbanisation, building roads* and *industry*. (Also creditable was *power supply/HEP* although that did not occur in any answers.)

Question 6

- (a) Candidates were given data on the percentage of the population experiencing food shortages in six continents in 2014 and 2018. They were asked to calculate the difference in the percentage between the two years in South America. The sum was *8.3 per cent – 5.6 per cent* giving an answer of *2.7 per cent*. This was done very well, although a very small number of candidates preceded their answer with a minus sign which was incorrect as the percentage increased over time.
- (b) Answers to **part (i)** almost always gained full marks. Candidates are expected to know the reasons for food shortages, and here they had to assign the seven reasons given to either natural causes or economic causes by completing a table. *Drought, floods, tropical storms* and *pests* were all natural causes and *low capital investment, transport difficulties* and *rising prices* were economic causes. **Part (ii)** asked candidates to suggest two reasons for another cause of food shortages: *Wars*. This was also answered well, with a large range of creditworthy responses. Most candidates stated the *destruction of crops/farms/livestock*. Other common answers were *farmers leaving their land to fight, food used to feed soldiers, inflation/increased cost of food* and *less investment in food as money is spent on the war*. Marks were also given for *destruction of irrigation, destruction of transport/manufacturing systems* and *panic buying*. Overall, answers to this question demonstrated a clear thought process relating to how war impacts food supply.
- (c) The concept of the methods to increase food supplies was more differentiating. Whilst some clearly understood what the question was asking and had excellent knowledge and terminology, others failed to use the causes of food shortages as a catalyst for their answer. In these cases, suggestions of *supermarkets stocking more food, eating less* and suchlike were not appropriate. The most basic answers of *fertilisers/manure* and *pesticides/insecticides/herbicides* often secured two of the three available marks. *Technology/machinery, food imports/trading* and *government subsidies/lowering food prices* were also widely credited. The strongest answers showed knowledge of *irrigation, aeroponics/hydroponics, high yield varieties, genetic modification/selective breeding* and *disease resistant crops*. Few answers mentioned *land reform, terracing* and *greenhouses*.

GEOGRAPHY

<p>Paper 0460/22 Geographical Skills 22</p>

Key messages

- The best answers are to the point. Candidates should plan their longer written answers to produce focused responses. On this particular paper some responses to **Question 1(e)** included material on vegetation and human features which were irrelevant. This is also linked to the understanding of key terms, in this case 'relief' and 'drainage', which should be practised. Candidates should be able to distinguish between human and natural features.
- More practice on grid references, distance calculations, and compass direction and bearings would be beneficial. Assessment of highest and lowest points in an area should be determined not only from spot heights and trigonometric points but also from interpolation from contours, for example in **Questions 1(c)(iii)** where the completion of the cross-section was for the most part, inaccurate and **1(e)** where the highest point of the relief did not go beyond the spot height at 1634m.
- Candidates should make sure they state the units when quoting data, e.g. metres above sea level from the map extract for **Question 1(e)** and population in millions from **Fig. 2.1**.
- Candidates should study the command words in all questions carefully. For example, in **Question 3(c)(i)** they were asked to describe the distribution; therefore, unless isolated, individual places did not gain credit. In **Question 4(a) and (b)** candidates were asked to describe the two rivers and their channels and then, their valleys. Therefore, there was no credit for comparing them or explaining the features described.
- When answering descriptive questions, such as from maps and photographs, candidates should avoid using negative phrases, i.e. stating what is not there, e.g., in the case of an answer to **Question 4**, 'The channel is not steep', or 'There are no rocks on the river bed'.
- Candidates should be able to use correct terminology when referring to locations or distributions: e.g., 'north' and 'south' and not 'above' and 'below' in **Questions 1(b)** and **6(c)(i)**.
- When candidates run out of space and write on the extra pages, they should make sure that the answers have the question number and part written accurately. In addition, they should write 'Continued on extra pages' at the end of the first part of their answer.

General comments

Most candidates made good use of geographical terminology and demonstrated their geographical skills in interpreting maps, graphs and photographs. The standard of mapwork skills exhibited a wide variation.

Some answers were so brief that they did not clearly answer the question, for instance, some one-word answers to **Question 6(c)(ii)** such as 'overpopulation' or 'unemployment'.

In general candidate performance in **Question 1** tended to be weakest. Overall, **Questions 2** and **6** were done particularly well. **Question 5** was found to be a little more difficult.

Despite there being some individual question parts not being attempted, especially for **Question 1**, there was little evidence that candidates ran out of time to finish the paper. While most were able to write accurately and effectively to convey geographical ideas, there were times when writing could have been neater. Most made good use of the space for their answers, in line with the number of marks available. Those using the extra pages tended to do so when their original answer was crossed out or where their writing tended to be large.

Comments on specific questions

Question 1

- (a) Candidates were able to find features on the map from Fig. 1.1 and identify them using the key with ease, and therefore, scored well on this question. The name of the river at **A** was the *F. Rienza*, although a few candidates wrote *Schotterwerk Cava di Ghiaia*, a name written across the river and not alongside it, which is the recognised convention for the name of a river. The feature at **B** was a *main road*, although some stated it was a *bus stop*. Since feature **B** referred to the whole line on Fig. 1.1, this response was not counted. Feature **C** was a *path with signs*, which was distinguished from just a path by the colour red instead of black. The height above sea level of the spot height at **D** was 1412m.
- (b) This was generally answered well, with most candidates clearly able to describe the course of the railway which crosses the map. The direction of the railway was from *north-west to south-east* or *east or vice versa*. There were a few candidates who were preoccupied with describing every bend, but only the general direction was accepted. The terms 'top', 'side', 'edge' of the map instead of compass directions were not credited. Many recognised that the railway curved, although the term 'not straight' – a negative statement – was not accepted. Others noted that it followed the course of the river, the F Rienza, as well as passing through the settlement of Niederolang Valdaora di Sotto. The fact the railway went through, under or over bridges was creditworthy; so was the fact that it went over/under roads and over rivers. However, 'going through' or 'connecting with roads and rivers' was not acceptable. In approaching this sort of question candidates are encouraged to think of the reality of the area and picture what happens. Very few candidates referred to the relief of the area, so the fact that the railway is found on relatively lower, gentler land in a valley was seldom seen.
- (c) The answer to (i), the feature at **X**, was a river or stream, the Rio Furcia or Furkelbach, but since there were several features in close juxtaposition, *minor* or *other road* or *path* were also credited. In (ii) the settlement at Y was *Mitterolang di Mezzo*, although *Moar Tharer* was also accepted. Many candidates did not name a settlement; some gave a settlement type such as nucleated or linear, while others named another feature, for instance a house. In **part (iii)**, despite a generous tolerance, most candidates failed to complete the cross-section correctly. It required a line rising steadily to touch the left-hand axis above 1350m and below 1450m. Some candidates left some parts of **Question (c)** blank.
- (d) It was apparent that many candidates had not practiced the skills needed to answer **part D** and were wildly out on some of their calculations. In (i) the distance along the road from the junction along the road at Wegmacher to where the road meets the eastern edge of the map at 749857 was 1925m. A generous tolerance of between 1750 and 2000m was allowed. In (ii) the bearing between these points was 29°, with a one-degree tolerance allowed either side of this figure. In (iii), the compass direction from the junction was north-north-east. In the latter most of the candidates wrote north-east and it seemed that many had not encountered or learnt the sixteen-point compass. In (iv) the six-figure grid reference of the junction was 741841, although many had written 742842 which was incorrect.
- (e) Those candidates who understood the concepts of relief and drainage seemed to have no problem with this question. Delimiting the question to a block of four grid squares helped candidates focus. Many recognised it as a high or hilly area (mountainous was also credited) and that it was steep. Better responses suggested it was gentler and or lower in the north. A few stated that the area was north-facing and some referred to the cliffs that were present. However, interpreting contour patterns was a weakness in many answers, with some considering the area to be relatively flat. Whilst the lowest point was identified (1100–1108m credited), the highest point was very rarely correct (1780–1799m credited). Those who did not understand what was meant by relief tended to give descriptions of any features that could be found within the four grid squares. This included *land-use*, *vegetation* and *human structures*.

Many candidates scored more marks on the drainage. References to the intermittent streams and springs were common and some recognised that some of the former were tributaries or formed confluences. Some also mentioned the Rio Furcia, a stream in the north-west of the area. Better responses noted that the intermittent streams drained to the north or north-east.

Question 2

- (a) The majority of candidates demonstrated that they were able to read data off the age-sex pyramids for Sweden and South Africa in Fig. 2.1 and stated that there were 300 000 females aged 0–4 in Sweden and 1 million males aged 55–59 in South Africa. The main mistake was a failure to include the units.
- (b) In most cases, candidates were able to interpret that there was a bigger proportion of young people in Somalia compared with Sweden and a bigger proportion of people of working age and older in Sweden compared with Somalia. Some overcomplicated their answers by referring to birth and death rates and life expectancy, or by describing changes within each of the three groups. This particularly occurred for the people of working age with some saying the proportions were equal. Those who described the shape of the pyramid, for instance having a wide base, often did so without interpretation and therefore did not score.
- (c) Most were able to interpret the relative population size of each country and rank them accordingly. The main error was to have Somalia and Sweden the wrong way round.
- (d) A range of reasons were given to account for the relative low number of people aged 20–24 in South Africa. The most common was that many had emigrated to other countries for work or education. Those who referred simply to migration needed to indicate the appropriate direction of migration. Other appropriate answers that were often seen included disease and war, although a low birth rate or high infant mortality rate were also accepted. High death rate, drugs, violence and high crime rate were seen but it was felt that these were either not especially appropriate, or too vague.

Question 3

- (a) Both **parts (i) and (ii)** were well answered with candidates deriving their answers from Table 3.1. They recognised the positive relationship between rank and population size in **(i)** and the negative relationship between rank and the amount of settlements in **(ii)**. Some candidates, however, just defined the terms rank, population size and amount of settlements, so were not answering the question set.
- (b) This question was answered well with most candidates using Table 1 to identify either a secondary school or a range of comparison goods as a service found in the small towns, but not in the villages.
- (c) (i) The best responses used compass directions to identify the large number of settlements in the north-west of Fig. 3.1, which were clustered around Whitehaven, and stated that there was only one key centre (Millom) and one village in the south. Some went on to state that the distribution was uneven. Some noted that many were found by the coast and/or along a (main) road. Lower scoring responses often focused on describing the position of individual settlements (other than the isolated nature of Millom) which did not constitute a distribution. Others were rather vague, for instance describing the settlements as being connected to roads or near the edge of the district boundary. Some referred to settlement patterns such as linear which does not really fit with this map.
- (ii) Many reiterated some of the points made in **part (i)**, but did not explain the benefit of being located on the coast, or near to large settlements. They should have considered the words 'for' or 'to' to develop their answer, for example 'near the coast for imports and exports' or 'for fishing.' The more common correct answers suggested near key towns or Whitehaven, for services, secondary schools or employment. References to tourism, flat land, minerals and fertile soils were sometimes seen and were perfectly acceptable. Many who suggested 'near roads', did not state what these roads were accessing; 'roads for transport' was too vague. In addition, while near 'a water supply' was creditworthy, near the coast for a domestic water supply was not.

Question 4

The best responses simply focused on and described what candidates could see in Fig. 4.1. and 4.2., while lower scoring responses were more generic, seeming to rely more on what had been learnt from the candidates' studies of rivers. Quite a few candidates confused rivers and their channels with their valleys.

Others compared the features of both rivers, especially river speed and width. Many described what was not there, for example 'It is not deep', or 'The river bed has no rocks'. Such negative statements were not credited. The description of human activity such as farming or fishing was also superfluous.

- (a) Those who scored well made it clear for each of Figs. 4.1. and 4.2. whether it was the river or channel that they were describing. For instance, in Fig. 4.1, it was the channel that was wide and not the river itself. The river could be described as having a variable width. There was frequent and correct reference to the meandering, slow flow and the shallow depth of the water. Some noted that the gradient was gentle or even flat. Few referred to the slip-off slopes and the fact they were comprised of sand. For Fig. 4.2, the rocks in the river channel were frequently commented upon, as were the steep gradient and the fast-flowing river. Only some candidates noted the island in the middle of the river channel, or that it divided into two channels. Almost nobody commented on the presence of pools. Potholes could not be seen clearly. No credit was given for reference to processes such as deposition, the presence of interlocking spurs or the vegetation.
- (b) The better responses recognised that the valley in Fig. 4.1 had a floodplain which was wide and gently sloping. Comment was often made on the vegetation and references to grass and bushes were credited. Features referring to the river and its channel were not credited, and the valley here was not regarded as a U-shaped valley. In Fig. 4.2 the valley was V-shaped and features such as spurs, the steep sides, and the rocks on the valley side were frequently credited, as was reference to the trees.

Question 5

- (a) For **part (i)** most candidates used Fig. 5.1 to correctly read off the mean monthly temperature for In Salah in May as 30 °C. However, some used the rainfall figures from Table 5.1 by mistake, to give an incorrect result of 0 °C. Only a minority of candidates stated the mean annual temperature for In Salah as 23.5 °C in **part (ii)**. In many cases it appeared that either the highest or lowest temperatures had been read from Fig. 5.1 incorrectly in making the calculation.
- (b)(i) Many candidates gave a valid difference between the climates of In Salah and Nouakchott. Most common of these were that Nouakchott was wetter than In Salah and that In Salah had a higher temperature range. However, references to temperature were often too general and did not refer to specific months. Consequently, statements like 'In Salah is hotter' could not be credited. Some comments lacked a comparison, for instance 'Nouakchott has rain in August and September' did not say that In Salah had none.
- (ii) Most answers compared latitude rather than proximity to the ocean and so failed to score. It was expected that the answer should be derived from Fig. 5.1, and thus a statement such as 'Nouakchott is on the coast while In Salah is inland' was what was required.
- (c) A range of answers was possible and quite a few candidates did score the full four marks available. The better responses seem to apply the water cycle to desert conditions to explain the lack of rainfall: for example, 'The fact that there were no water bodies or few rivers and lakes, meant that evaporation was low leading to a low amount of water vapour that could condense into clouds'. Similarly, 'the lack of vegetation meant that evapotranspiration was low leading to a similar scenario'. Some also mentioned that there was high pressure which tended to lead to sinking air, so no condensation. There was also reference to the presence of rain shadow areas, cold ocean currents and dry winds. Many weaker responses, though, were rather vague, suggesting some candidates had not studied the topic. Some referred to distance from the Equator or the Tropics rather than distance from the sea, while others focused on the high temperatures leading to a high evaporation rate and low rainfall. The formation of convectional rain and low pressure were also mentioned but not relevant.

Question 6

- (a) Most candidates were able to correctly identify the type of industry for each of sector's A to D using Fig. 6.1. If mistakes were made it was usually that quaternary and tertiary industry were the wrong way round. Occasionally some candidates wrote primary industry for both sectors A and B.
- (b) The majority of candidates successfully interpreted Table 6.1 to identify the true statement in the table to be the third one.

- (c) (i)** Most candidates described the distribution of the twenty-one low-income countries shown in Fig. 6.2 well. They pointed out that these were found in Africa or Central Africa, and near the Equator or between the Tropics. Some commented on the uneven distribution, and others commented that it was clustered. Quite a few candidates wasted wordage by repeating their description of the tropics at length, whilst others used terms such as 'above' and 'below' the Tropic of Cancer or Capricorn or the Equator, when compass directions should have been used.
- (ii)** A wide range of acceptable reasons why the countries shown in Table 6.1 and Fig. 6.1 have low incomes were seen. These included the reliance on primary industry, lack of education, war or political instability, and corruption. However, many responses were vague and not developed to show how they hinder development. Examples are high unemployment, overpopulation, poor transport and 'because it is an LEDC'. In addition, 'a lack of resources', was seldom qualified.

GEOGRAPHY

Paper 0460/23
Geographical Skills 23

Key messages

- Candidates are advised to measure grid references, using a ruler to obtain an accurate figure for both third and sixth digits. They need to know how to do this successfully at both 1:25 000 scale and 1:50 000 scale.
- Candidates should practise working with cross-sections and make use of a ruler when attempting to match features on the cross-section with locations on the map.
- If asked to describe or define a term, candidates should select alternative wording rather than using the term itself as part of their answer.
- Candidates must read questions carefully to avoid misinterpretation.

General comments

This paper was comparable with previous sessions, with most candidates attempting all sections, including writing in some detail for the extended writing sections of **Question 1(f)**, **Question 3(a)** and **Question 6(b)**. **Question 1(e)** was the only section that was omitted by a significant number of candidates.

Question 2, **Question 4** and **Question 6** were all found relatively straightforward, and, except for **part (b)** and **part (e)**, **Question 1** was also fairly straightforward. Candidates appeared to find **Question 3** particularly difficult.

Comments on specific questions

Question 1

- (a) The 1:25000 map was for the area around Sabbio Chiese in Italy. Through Fig. 1.1, candidates were directed to look at an area of 9 km² in the north of the extract, to identify various features.

The type of road at A was a *tarred road*. Most gave the correct answer, but others opted for a *provincial road*, which would also be coloured yellow. The two symbols were adjacent in the key, so could easily be compared, with road A clearly showing the narrower width.

The river at B was *R. Sibla* and most candidates gave the correct answer.

The height above sea level of the spot height at C was *560m*, and again most candidates gave the correct response.

Feature D was a *path with signs*. There were several different path symbols on the map, so the 'with signs' part was essential for the mark. Most candidates did write the entire phrase, but a few just put 'path'. A few had not noticed the dashed nature of the line, so answered with 'mule track'.

The name of the settlement at E was *Mastanico*, which was correctly identified by the majority. Some small variations in spelling were also accepted, due to easting 12 running through the label. Common errors here were to identify the house symbol or to name the type of settlement.

- (b) Still using Fig. 1.1, the trigonometric point at F had a six-figure grid reference of *121575*. The small triangle symbol was entirely within this reference, without ambiguity, but candidates seemed to struggle with the 1:25000 scale. There were many errors with the third and/or the sixth digit. Some had switched the first three digits with the second three.

- (c) Pavone was a *linear* settlement, particularly stretching away to the west. Most of the candidates realised this. The remainder had focused only on the eastern end, choosing *nucleated*.

Candidates then had to give the reason for the pattern. Most mentioned that the *settlement was along the road*. Others suggested *along the river or the valley*, which were equally valid. *Between the river and the steep slopes* was also an accurate observation. Those answers which did not score were usually too vague, with comments such as *near the road*, or *having access to a road*, which could apply anywhere.

- (d) With two roads labelled 237 in grid square 0959, candidates were told that the provincial road they needed to locate was coloured yellow. They then needed to measure from the roundabout (circle) in 0958, along the provincial road to the northern edge of the map and use the map scale to translate their measurement into a distance in metres. Four options were given; the correct choice was *1800m*, which most candidates correctly selected.

Candidates then had to give the compass direction from the same roundabout (circle) to the parking in Sabbio Chiese. *South-east* or *south-south-east* were acceptable directions, and many gave one of those answers. Those who failed to score had often not read the question carefully, and instead gave a bearing.

- (e) Fig. 1.2 was a partially completed cross-section along part of northing 58. Features X and Y were labelled for candidates to identify. The most reliable and accurate method was to measure on the cross-section and take the same measurement to northing 58. Feature X was the river *F Chiese*. However, the river at this point was also marked with a line of dots along the channel. Thus, the alternative answers of *boundary of municipality* or *difficult path* were also accepted. Feature Y was the *main road*. Few candidates got both correct, and some put them the wrong way round. Some were clearly not using the northing 58 line, having selected *bus stop* from the middle of the grid square.

Candidates then had to complete the cross-section. Working from the end of the incomplete line, and moving towards the axis, the hill needed to peak at a height between 440m and 460m and then descend to meet the axis between 300m and 350m. Most candidates showed the peak correctly, but relatively few took the line down to the correct point on the axis. It might be helpful to explain to candidates that the vertical scale exaggerates the slope steepness, so that they go with what the contours tell them, rather than what looks right.

- (f) Candidates were then asked to study the river between Barghe and Sabbio Chiese and describe the physical features of the river and its valley. Many scored most of their points for their comments on the river, though two marks were reserved for each aspect, so they also needed some valid description of the valley to reach the maximum of six. Most mentioned that the river was *meandering*, and some also pointed out the *straight sections*. They commented on the tributaries and the island in 0958. The flow direction of south or south-east, and the variable width, could be applied to either the river or the valley, though the former in the case of the valley needed to be expressed as orientation. Other valid points for the valley included *narrow*, *steep sides*, *flat floodplain* and its *U-shape*, which could be particularly seen on the cross-section. A few wrote about the river at Barghe and at Sabbio Chiese, comparing the two locations, which restricted their answer but still enabled them to score some marks. Others ignored the instruction not to refer to land use.

Question 2

- (a) The graph in Fig. 2.1 showed population change between 1950 and 2020 for the entire world, and also Asia and Europe as separate regions. Most candidates were able to correctly determine the world population in 2020, being *8000 million*. Incorrect answers usually had the value for the year 2000.

Candidates then had to compare the population change in Asia and Europe across the range of the graph. Some pointed out that both areas had seen an increase, but the majority compared the increase in each location, indicating a bigger increase in Asia. The second mark was for correctly reading the graph to obtain the relevant statistics for both locations in 1950 and 2020 or using that data to give the magnitudes of the increases. Errors here often involved an incorrect number of zeros.

- (b) Table 2.1 showed population data for the United Kingdom in 2018, and candidates were asked to use the figures to calculate both natural population change and overall population change. Natural population change was 2 per thousand, while overall population change was 5.9 per thousand. Most candidates had correct answers, though some had muddled natural change and overall change and switched them. A few had added all three numbers for the overall change.
- (c) Candidates were then asked to suggest reasons why a country's birth rate might fall. Most were able to give at least some relevant points, with many scoring two or three marks, and those that mentioned *education for girls* and *female employment* as part of the same idea often reached full marks without needing the third answer space. Other frequently used ideas were *birth control*, *cost of raising children* and *government policies*. Valid points also included *abortion*, *later marriage*, *less infant mortality*, *less child labour* and *the effect of war or famine*. A few of the weaker answers mentioned education or careers without referencing the female side of the population.

Question 3

- (a) Fig. 3.1 was a photograph of a rural settlement in France and candidates were asked to explain the factors that may have influenced its site. Many had some ideas, but often did not explain effectively. They noticed the steep landscape but said that the housing was on flat land, rather than the gentler slopes. They often mentioned the trees as a supply of wood, but not that the wood could be used for construction or fuel. Successful points were more likely to be for the road, giving access to transport or trade and the high land or cliff being suitable as a defensive site. A few mentioned the sunny aspect, the benefit of the valley for shelter or the useful stone for either construction or employment in the extraction industry. Many assumed the presence of vegetation indicated soil fertility. Some candidates had focused on the word 'rural' and wrote about the advantages over an urban area, such as attractive scenery, lack of pollution or cheaper housing. Some thought that the question was asking why people would not wish to live there. Few candidates scored more than two marks.
- (b) Fig. 3.2 was a visual representation of the relationship between size of population and the number of services in a settlement and candidates were asked to describe the relationship. The most common answer was to say *the higher the population, the more the services*, but simply mentioning positive correlation was also enough for the mark. Candidates usually scored the mark available.
- (c) Candidates then had to select the low-order service from a choice of hospital, shoe shop or primary school. The correct answer was *primary school*, but the most frequent answer given was *shoe shop*. Their answers in **part (ii)** gave some clues as to why they had selected the latter, with many relating to their own needs, rather than considering a community as a whole.

Incorrect understanding of a low-order service it made it difficult for candidates to score in **part (ii)**. A low-order service has a small sphere of influence because *there are many of them* and *people are not prepared to travel far to access them*. It has a low threshold population as it is *used frequently*, so *a small number of people can provide enough profit*. Candidates tended to find the idea of sphere of influence easier to explain than threshold population. The question was asked in general terms, but many used their answer to **part (i)** as their starting point, which made it more difficult, even if they had the correct answer in **part (i)**. Some were still trying to link to the rural settlement from **part (a)**.

Question 4

- (a) Fig. 4.2 showed sites along the North Sea coast of the UK and Fig. 4.1 was a graph of the average erosion rates for the sites. Candidates were asked to state the average erosion rate at site 11, which was a simple matter of reading from the graph. Almost all the candidates gave the correct answer of *4.3 metres per year*.

Fig. 4.2 also showed the position of the settlement of Withernsea, with a road passing through it, providing the reasons for coastal protection being used between sites 4 and 7. This was correctly suggested by most candidates, though a few were rather too vague with *to prevent erosion* and some referred back to the graph in Fig. 4.1, where they had noticed no erosion occurring at these sites.

- (b) The three coastal protection methods used at Withernsea were shown by a photograph in Fig. 4.3. Candidates were asked to choose one of the methods and explain how it would protect the coast. The most popular choice was *sea wall*, followed by *groyne*, with rock armour the least popular. Those that opted for *sea wall* usually focused on its role as a barrier, to prevent erosion and flooding but some also referred to *reflection*, *deflection* or *dispersal of wave energy*. The role of groyne in *trapping sediment* and *preventing longshore drift* was well understood by those who chose this method. Those who tried *rock armour* seemed rather more uncertain. They could have mentioned *trapping sediment*, *absorbing energy* or *preventing erosion undermining the sea wall*; most mentioned just one of these.

Candidates then had to continue with the same method and describe its advantages and disadvantages, with two marks available for each. Again, the best scores were from those who chose *sea wall*. For advantages, they mentioned the *prevention of flooding*, *creation of the walkway along the top*, that it was a *relatively long-term solution* and that it *did not take up beach space*. Groynes could be *constructed relatively quickly and easily providing a cheap solution*, while rock armour would also be *quick to construct and cheaper than a sea wall*. Moving to disadvantages, *visually intrusive* could be applied to all the methods and many commented on *difficult access* to the beach for the sea wall, or along the beach for the groynes. For the rock armour they pointed out the *potential danger to the public in having to cross the line of rocks*. Candidates typically scored two or three marks, doing better on the disadvantages than the advantages.

Question 5

- (a) Fig. 5.1 was a version of the hydrological cycle and candidates were asked to name the four processes that were labelled on the diagram. A was *condensation*. B was *precipitation or rainfall*. C was *interception*. D was *surface run-off or overland flow*. The most likely correct answer was B, and many had at least one other also correct, particularly A. Common errors included *cloud* for A and *river* for D, rather than the processes. Some put C as *transpiration*.
- (b) Candidates were then asked to describe evapotranspiration and groundwater flow which had been labelled on Fig. 5.1. Many found this quite difficult and most scored only one or two marks. The most common correct point was for accurately describing evaporation, but many were vague about the transpiration element. A few did pick up a mark for noting that *evapotranspiration combines evaporation and transpiration*. Regarding groundwater flow, few went further than saying that *the water was returning to the sea through the ground*. A few got a mark for mentioning *downhill* or *gravity*, but some assumed the movement was through the soil, rather than the rock and few mentioned cracks or pores in the ground. A small number did use terms such as *aquifer* and *permeable rock*.

Question 6

- (a) Fig. 6.1 showed an agricultural system for an arable farm, with sections for natural inputs, human inputs, processes and outputs. Candidates were offered a space within each category and had four words to insert correctly into the figure. Very many did this successfully, with *relief* going into natural inputs, *labour* being a human input, *planting* being a process and *vegetables* providing an output.
- (b) Finally, candidates were presented with Fig. 6.2, which divided Europe into three zones and suggested main impacts of climate change in each, and Fig. 6.3, which gave facts about agriculture in Europe. Candidates needed to consider the information, to suggest possible impacts of climate change on agriculture. Many selected information from each region in Fig. 6.2. They then linked each to the potential change in one or more of the facts in Fig. 6.3. There were many ways to do this, and most candidates scored at least three marks. For example, they pointed out that 'increased risk of flooding, in the continental region, would result in less land being available for agriculture, resulting in farmers becoming unemployed, lack of surplus available for export and potential food shortage'. Those who failed to score often wrote about the agriculture and climate change without referring to the specific information in Fig. 6.2. Higher temperatures leading to a decrease in yield was a common misconception.

GEOGRAPHY

Paper 0460/03
Coursework

General comments

While this is a report for the November 2024 examination series, the comments made here will be of use to centres making their entries for the first time in June and November 2025. The key messages and comments on specific assessment criteria below are derived from the analysis of centres who entered coursework for either of the June and November 2024 examinations.

The range of Topics undertaken was very similar to that in the previous November series see the following table:

	topic
human	environmental risks of economic development
	population and migration
	settlement and service provision
	tourism
	urban settlement
physical	coasts/sand dunes
	rivers

Whilst some conducted investigations in their nearest urban area, such as in Whanganui, New Zealand, others went much further afield, such as from Gaborone 178 km across country to the Jwaneng Diamond Mine in Botswana, or from Lima five hours south to the sand dunes surrounding the desert oasis of Huacachina in Peru.

This report focuses on points where the moderation process could have been a little smoother or where candidates could improve their coursework to access higher grades. There is training available online for teachers who are new to the coursework option. There is also the Coursework Handbook available from Cambridge Assessment International Education which includes examples of coursework which are annotated to show how they should be marked. It is also strongly urged that centres read and take note of this report's content together with the *Moderator's comments on school-based assessment of coursework* which each centre receives.

Centres are advised not to allocate different topics to each of their candidates.

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

If a centre is unable to send candidates out in the field to collect primary data, there is the option of using *quantitative* secondary data, for instance from the internet, although the centre should inform Cambridge International if this is the case. One example is weather statistics available from local weather station websites. The source must be clearly stated. However, centres submitting essays which are merely an amalgam of texts written on geographical topics and sourced from the internet are not following the 'Route to Geographical Enquiry'. They do not possess numerical data which can be presented graphically and analysed, and hence it is not appropriate for the requirements of this component.

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

Key messages

- Some very good Geography was seen. Most centres demonstrated a very good grasp of their chosen topic, with their candidates undertaking appropriate hypotheses. A clear understanding was demonstrated by most candidates of the 'Route to Geographical Enquiry,' resulting in well organised studies containing the five sections outlined in the syllabus, often with an accurate table of contents. However, some centres' coursework was imbalanced, typically with a long *Introduction* and *Observation and Data Collection* section at the expense of *Analysis* which was relatively short. Some tables of contents contained page numbers, but these were not always accurate, or in others there were no page numbers.
- Many candidates displayed a very good background knowledge of their chosen topic, although this was not always well linked to the stated aims of each study. Geographical models outlined in the introduction were often given only cursory attention in the analysis and conclusion, or none. Some geographical theory should appear in all introductions.
- Geographical theory should form part of the justification for the hypotheses, and in turn should be linked to the area of study, for example when reviewing siting factors ideal for a retail outlet.
- The most successful conclusions were arrived at because of clear hypotheses laid out at the beginning of the enquiry. Two or three hypotheses are enough to ensure a sufficient depth of reasoning in the analysis. Many hypotheses together with data collected on too many parameters invariably leads to a simplistic analysis or overlength 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 often well described and understood. Sampling procedures, however, were often inadequately described or 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.
- Some centres utilised an impressive range of both complex and simple data presentation methods. By contrast, in some other cases a reliance on only simple methods often led to overmarking. Furthermore, many presentation techniques were rendered ineffective by the absence of correctly labelled axes (to include units). Line-graphs were often used inappropriately.
- All maps should have a scale and orientation and those originally from secondary sources such as Google must be clearly utilised.
- The inclusion of photographs considerably enhanced some enquiries. However, to be worthy of credit they must be well annotated as well as having a title. They should also be individual and not appear in other studies.
- The best responses gave well-reasoned explanations to support their findings. In lower scoring studies many reasons given were merely 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, and sometimes very generic. While most candidates demonstrated that they understood some limitations of the study undertaken, feasible suggestions for improvement or extension of the study often lacked detail.
- References to shortcomings in the methodology should only be written in the evaluation, not in the data collection section.
- Most candidates adhered to the word limit of 2000 words. A word count should be declared so that candidates can focus on adhering to it; centres are reminded that it is their responsibility to make sure that candidates do adhere to the word limit. The best studies were those that were concise. Please remember that text placed in tables still counts towards the word limit.
- New centres should note that they are expected to justify how the marks have been awarded. Phrases from the *Generic Mark Scheme for Coursework Assessment*, which was used by every centre, can be utilised for this. There were conscientious and copious comments made on scripts by many markers.



- Generally, the marking done by centres was accurate and there was agreement over the rank order of candidates. Where there were disparities, it was usually due to the undermarking of *Organisation and Presentation* and over-marking of the *Analysis and Conclusion* sections. Any changes required usually occurred at the top and lower end of the mark distribution. It is important not to overmark candidates who do not collect any data but use only texts from the internet.

Comments on specific assessment criteria

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

The criterion of *Knowledge with Understanding* tended to be assessed accurately. Where disparities occurred, it was often because the marker seemed to take only the candidate's introduction into account. This is largely the *knowledge* element, while 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. Nevertheless, there is still work to do to ensure candidates' introductions are not too long compared with the rest of the study. Many followed some initial aims with a prolonged background information section. Some candidates want to write all they know on a topic. However, extended paragraphs of the history of the locality, for example, are often irrelevant. Glossaries of geographical terms should be avoided since many of the terms are not mentioned again. Many candidates place the theory before their hypotheses, rather than the other way round, which encourages greater selectivity. On the other hand, some candidates tend to be far too brief in their use of theory; this was common in using Bradshaw's Model or urban land-use models, where once having scanned the diagram(s), only a few simple sentences (if any) were written to explain the relevance to the hypotheses. In the better studies these theories proved a focal point throughout, with some 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 to encourage candidates to use two core hypotheses and a third chosen by the candidate themselves. This resulted in a more focused study with greater evidence of individual work. The use of four or five hypotheses or a generic guiding question was usually associated with a superficial analysis. Furthermore, it is questionable whether some candidates understood the nature of a hypothesis. Some expressed their hypotheses as questions rather than statements, and this seemed to result in a failure to fully explore the findings, with a brief 'yes' or 'no' in the concluding section.

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

The criterion *Observation and Collection of Data* was almost always accurately assessed by the markers and very few adjustments had to be made, other than where no primary data was collected at all. Indeed, they are in the best position to judge the input individual candidates made into the processes of data collection.

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. Not all centres managed to collect questionnaires from the recommended number of fifty respondents. Often this was because of single groups of three or four candidates working on their own and not as part of a larger class where data is pooled.

The data derived from only five to eight questionnaires are usually inadequate. Similarly, bi-polar analyses assessing the environmental quality need more than two or three sites within the urban area from which observations are made. For river studies, ten locations are ideal. While this might not always be achievable due to constraints of candidate safety or of time, in river studies there is no shortage on the different parameters on which data can be collected, allowing a range of hypotheses, in order that each study is more individual. Where the number of sites is under six, a centre might consider measuring each site at three different cross sections, each a minimum of 100 m apart. Few centres explained their choice of data collection sites, for instance stratified sampling to represent the three stages of a river. Even if sites are chosen by the teacher, the candidate needs to justify why they were chosen. This also applies to traffic surveys and pedestrian counts.

It appears that methods of sampling could be much better understood. Few candidates went into any depth of discussion on their sampling strategy and its justification. This was particularly common for those undertaking questionnaires in urban environments. If respondents were accessed on an opportunity basis, then it needs to be stated and justified. Conversely, the description of the use of equipment for data collection tend to be quite detailed and reflect a high level of understanding. More candidates are now linking their methods to their hypotheses which helps demonstrate their level of understanding. This is particularly the case where the data collection methodology is well set out in tabular form. However, many of these tables also include some evaluation of each data collection technique. Since all wordage in tables counts towards the overall word count, this is best left for the concluding section of each study.

The time given over to data collection is another issue, especially when the time available on the centre's timetable is limited. A surprising amount of data can be collected in a relatively short space of time when a large number of candidates are divided into small groups to cover a large area, each coordinated to do similar activities such as a pedestrian or traffic count. On return to the centre 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 who attempted to collect data in one or two hours. The key to maximising your time when collecting data is in the time spent planning beforehand, and the preparation of the participants, even to the extent of undertaking a pilot study.

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

The use of secondary data can play a valuable role, for placing the study in context in the introduction or particularly for comparison purposes. For instance, there is the opportunity to compare data collected at the present with that collected by candidates from the same centre in the past on the same topic. Where a centre is, for any reason, unable to carry out their primary data collection fieldwork, numerical data could be utilised from secondary sources such as weather stations or censuses. The use of secondary data does not extend to synthesising written information taken from the internet, teacher's notes or textbooks and putting it together in essay format. This would not gain any credit for *Observation and Collection of Data* or *Data Presentation or Analysis*.

Organisation and Presentation continues to be the criterion where most cases occur of any disparity between markers and moderators, especially at the lower end of the mark distribution. Some studies which had scored higher marks were overmarked due to the lack of complex methods of data presentation and/or the absence of well-utilised location maps. Conversely, 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, line graphs used for discrete rather than continuous data which meant they were inappropriate. Simple bar graphs were seen in different guises but only count as one technique. Furthermore, the same data presented in several different ways only count once. 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 *Generic Mark Scheme for Coursework Assessment* to deduct marks for other ineffective or inappropriate graphs. On the other hand, if candidates use many more than three techniques (in addition to a location map) it means that their time could probably be used more effectively, for example on a more detailed analysis.

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 they analyse the data shown by each graph/diagram/map in turn, making sure that none are redundant. Candidates should be discouraged from placing all their graphs together in one section, whether it is before the *Analysis* or in an appendix at the end. This also includes beach or river profiles as well as statistical tests.

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

A large range of techniques was utilised by some candidates to represent the data. Some candidates used techniques with more complexity, and this was largely successful. Where this was not the case there was still a reliance on basic bar charts, line graphs, pictographs and pie charts. These techniques can often be located on maps at the sites studied to render 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 and beach profiles are considered a higher-level skill, although these must be created carefully to the same scale to facilitate ready comparison. Some candidates scanned their profiles to fit the page which meant they were at different scales. There was an absence of field sketches which when clearly linked to the field study area with appropriate annotations, can considerably enhance a candidate's study. A few candidates used statistical techniques such as Spearman's Rank Correlation and the candidate's t-Test. These can also count as a complex presentation technique, provided the candidates demonstrate the complete working themselves and do not rely on the press of a computer key for the result.

Many bar, line and scatter-graphs were rendered ineffective by 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 check the results carefully and make any necessary changes. Furthermore, some candidates made incorrect use of line graphs for non-continuous data. Their best use is to track data over a short or long period of time.

Some centres' candidates produced some very well annotated photographs, graphs and maps. Anomalies on graphs, for instance, were highlighted by a circle leading to an arrow and relevant comment. However, this was not the case in many studies where photographs had no annotations and were not referred to in the text. Others had just a title and/or simple labels that did not count as complex. These served little purpose. Centres should make sure that their candidates know exactly what is expected by annotations; a paragraph written underneath the photograph for instance, does not count. Three appropriate annotations are expected on any photograph for it to be complex.

It is best for the original hand-drawn graphs, field sketches and diagrams to be included in any study rather than being scanned in, albeit at an appropriate place. These become more difficult to read, especially when they are scanned in monochrome. Candidates are reminded that each graph 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, it is important to avoid the same range of computer-generated graphs appearing in every study that a centre's candidates submit; candidates must make every effort to individualise the graph, for instance by using annotations to highlight certain features.

The *Analysis* was overmarked by a few centres, especially at the top end of the mark distribution. The requirement for reasoned explanations at Level 3 was sometimes overlooked: work was inappropriately placed in this Level when the reasons given were very short and tenuous. Some of the marker comments on the scripts revealed that the higher marks were being given for explanations which were far from being developed. The *Analysis* section is where candidates can really demonstrate their level of understanding. However, the depth of analysis will be 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 its candidates have enough data at their disposal, so it is important that the centre organises a group data collection strategy.

This was the lowest scoring criterion for many candidates. 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 Level 1, but most stayed in L2 or the bottom of Level 3 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. Only a few candidates clearly identified anomalies from graphs, using numerical values to show why they were anomalies and explained them with reasons that were creditable. In general, much of the explanation was speculative with no firm foundation. Phrases such as 'The reason might be/could be/may have been', were common.

There was some valid but limited use of statistical techniques, such as *Spearman's Rank Correlation Coefficient* and the candidate's *t-Test*. 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 interpreted in a limited way, especially when produced by computer with no workings shown. This lack of understanding also extended to tests for the level of significance, with very few candidates commenting on how the result impacted on the hypothesis. It is therefore important that centres make sure that their candidates not only understand how to use statistical testing, but also why they are using it.

The *Conclusion and Evaluation* was marked accurately apart from in some studies where accounts which lacked key data had been over-credited. The Level 3 criteria in the Generic Mark Scheme for Coursework Assessment states that conclusions must be 'clearly related to evidence collected'. The key data should be either examples of numerical data or stated characteristics shown on graphs, maps and tables which are clearly referenced: e.g. 'On Fig. 2 it can be seen that....'. Some responses were given high marks even though they used this evidence very sparingly or not at all and generally lacked the expected depth of discussion and explanation.

Most candidates summarised their findings well, although many were rather brief. 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. But many other responses lacked the evidence to support their assertions, whether qualitative or quantitative, and explanation was rather superficial. Theory quoted in their introduction tended to go unmentioned. Most common was the lack of key data which limited progression to the higher Level 3 marks.

An evaluation section is expected as part of the conclusion. Markers are reminded that they should consider comments made in the methodology section, which usually refer to the effectiveness of the equipment used. They should, however, be alert to any repetition of points made in the conclusion. Candidates tended to make some valid criticism of their data collection strategies, and many came up with one or more realistic improvements, with better responses 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, e.g. 'we should have collected more questionnaires' or 'we should have sampled more sites'. Most of the evaluation was reserved for comments on things that did not go well, but there was some comment on what did, even if few went on to say why it was effective and most were somewhat superficial, e.g. 'the fieldwork went very well' with 'very good results'. Better responses made some perceptive comments on how the study could be extended. The evaluation remains a good gauge of a candidate's level of understanding of the topic undertaken. It also gives an insight into whether the candidates enjoyed the fieldwork experience, which most seem to have done.

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. For those that were adjusted this was not always across the whole mark distribution. There seemed to be a pattern of negative adjustments at the top end and more positive ones at the lower end. Those centres which had a negative adjustment applied, were generally relatively new to the moderation process; the reasons are detailed in the document *Moderator's Comments on School-based Assessment of Coursework* which each centre receives.

Most centres added appropriate comments to their candidates' scripts to justify the marks awarded. Those who added a cover sheet with some overall comments must also be thanked. These generally used the wording from the *Generic Mark Scheme for Coursework Assessment*. Very occasionally, it highlighted when a marker had misinterpreted the mark scheme. If centres have not done so in the past, it would be very much

appreciated if markers make these comments (in pencil) on the scripts in their next submission. Scripts marked with just ticks are of little to no help in the moderation process.

Cambridge International accepts one piece only of coursework for each candidate. Where two different fieldwork exercises have been carried out, it is up to the centre to see that the one attaining the higher marks according to the *Generic Mark Scheme for Coursework Assessment* is the piece that is sent. The centre must also make sure that where coursework is based on different topics, these are of equal value in giving the opportunity for candidates to achieve their potential. Cambridge International does not advocate each candidate being given a different topic on which they 'go out into the field' alone to collect data.

Please make sure you check the latest documentation from the School Support Hub to ascertain the exact number of scripts that should comprise your centre's sample. For centres outside of the UK, at present this as follows:

0–10 candidates	– all scripts
11–50 candidates	– 10 scripts
51–100 candidates	– 15 scripts
100–200 candidates	– 20 scripts.

Almost all centres submitted their coursework sample to Cambridge International on time, before the 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 script and not sent in the overall package in one pile. In addition, please make sure that candidates are listed in candidate number order on the Coursework Assessment Summary Form.

Most of the paperwork was completed accurately and included with the sample, although there were cases of centres who did not include all the Coursework Assessment Summary Forms which can delay the moderation process. 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. The most usual errors are as follows:

- Where the addition of the assessment criteria marks on the Individual Candidate Record Card is incorrect and is subsequently transferred to the Coursework Assessment Summary Form and then to the MS1.
- Transcription errors from the Coursework Assessment Summary forms to the MS1 forms. Occasionally, this may occur where an internal moderation has taken place, and the candidate's original marks have been entered instead of the changed mark.
- The original marks are entered on the Internally Assessed Marks Report or MS1's instead of the internally moderated marks.

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

Where a centre has more than one marker it is essential that an internal moderation takes place. There is clear evidence that these are conscientiously carried out by most centres. 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 external moderator's job to be carried out effectively. There have been occasions when one marker's marks from a centre has differed markedly in standard from the remainder of the centre's markers and an internal moderation is the best way to resolve this problem. Where an internal moderation has resulted in no change of marks this should be stated on the Coursework Assessment Summary Form. It is marks derived from the internal moderation that should be entered on the MS1 or the Internally Assessed Marks Report.

GEOGRAPHY

<p>Paper 0460/41 Alternative to Coursework 41</p>

Key messages

To perform well on this paper candidates should:

- When answering hypothesis questions that ask whether they agree or not, always give their opinion first before any supporting evidence: this will usually be 'Yes', 'No', or '*Partially*'/'*To some extent*'. If questions ask for answers to support their decision with data, then statistics must be used from the resources referred to. Data is quantitative; evidence can be qualitative or quantitative. If candidates make an incorrect conclusion to the hypothesis, they will gain no credit for the answer.
- When giving figures in an answer, always give the units if they are not stated.
- Read questions carefully and identify the command word, e.g. 'Describe', 'Explain', 'Suggest'.
- When asked to compare or make judgements, use terms such as 'higher', 'lower', rather than just listing comparative statistics. The use of 'only' with statistics is not accepted as a comparative statement.
- If comparing statistics, note that it is important to use paired data rather than one set on its own.
- Check that they are using the resources that the question refers to, e.g. 'Support your conclusion with evidence from Fig. 2.4 and Table 2.3'.
- Attempt all completion tasks on graphs, tables, or diagrams (not all the answers are on lines and in writing). Many candidates are missing out on marks by not attempting these questions.
- Consider the mark allocations. Examiners do not expect candidates to be writing outside of the lines provided, so candidates should not write a paragraph when only two lines are given as this wastes time.
- If candidates need to write more than the lines allow, indicate this with a phrase such as '(continued on additional page)'.
- When completing graph work, use a dark-coloured pencil or pen. They should use a ruler to draw lines. Candidates should always shade bar graphs and pie charts accurately. They should make sure their shading matches what is shown in the key.
- When they think that they have finished, check that they have not omitted a question. Some questions might have been overlooked if they are on pages with a lot of graphs or maps. Candidates should make sure that they have answered the questions on every page of the paper: this applies especially to questions where they are asked to complete tables, diagrams, graphs or maps.

General comments

All candidates achieved marks on the practical questions, such as drawing and interpreting graphs and tables. Stronger responses were also successful on the more challenging sections that required explanation and judgement, especially regarding hypotheses. Most candidates answered **Question 2** slightly more successfully than **Question 1**.

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

Some candidates misunderstood or ignored command words, and some did not use appropriate fieldwork techniques and equipment. Those questions where candidates did not score well often related to their not having carefully read the question, for example **Question 1(c)(iii)** where some candidates focused on how a maximum-minimum thermometer works rather than how it is used to get temperatures.

Question 2(c)(ii) required candidates to consider suitable methodology for a fieldwork task. This type of question, or a similar question suggesting improvements in methodology, is frequently included on this paper. 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 worth credit.

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

Comments on specific questions

Question 1

- (a) (i)** This was a challenging question for many candidates, and a few did not attempt to answer it. Stronger responses gave clear explanations why a maximum-minimum thermometer is kept in a Stevenson screen. Weaker responses did not suggest valid ideas; they gave vague or incorrect answers, such as 'to keep the instrument out of the rain' or 'to protect it from the wind' or 'to get accurate results.'
- (ii)** Stronger responses included correct suggestions. Weaker responses named a rain gauge, anemometer or wind vane. Candidates need to study weather instruments and the Stevenson screen.
- (iii)** Few candidates gave clear descriptions of how to use a maximum-minimum thermometer, which suggested that they were not familiar with this weather measuring instrument. A few candidates described the process of reading the thermometer at the bottom of the index, then resetting the thermometers after reading the temperatures. Some described how the temperatures are read every day or at the same time of the day. Some candidates described what the thermometer looks like and how it works but not how it is used to measure temperatures, which was what the question asked.
- (b) (i)** Some candidates drew accurate, well labelled diagrams of a traditional rain gauge. Other attempts were vague or unrecognisable as a rain gauge. Some candidates did not attempt to draw a diagram but left the space blank. Some drew a reasonable diagram but did not label it. Others drew an instrument that looked like a measuring tube or cylinder which was not valid for the diagram mark, but they did gain credit for labels such as scale. The instruction was to draw a diagram of a traditional rain gauge – not a pluviometer or home-made gauge, which some candidates mistakenly drew. Several candidates drew an appropriate diagram but omitted the outer casing of the rain gauge.
- (ii)** Some candidates could not draw a diagram of a traditional rain gauge, though more were able to describe where to put it. References were most often made to putting it away from buildings or trees or in an open area. Other candidates correctly suggested putting the rain gauge somewhere away from people or animals, or on grassland rather than concrete or a pavement.
- (iii)** Many candidates were able to explain why the rain gauge should be in the position they had previously described. There were many references to keeping the rain gauge away from obstructions so all rainfall could be captured, and to prevent interception. Some candidates referred to the gauge not being tampered with, or the prevention of rainwater splashing up from an impermeable surface.
- (c) (i)** Most candidates correctly calculated the 12° difference in temperature which occurred on day 8. Some candidates made an error in their calculation and gave incorrect answers of 11° or 13°.
- (ii)** Most candidates identified correctly that most rainfall is recorded on day 3. Some candidates did not study Table 1.1 carefully and identified day 7, which was the second highest measurement.
- (d) (i)** Several candidates correctly named 'secondary data'. Common wrong answers included 'external', 'primary', 'estimated' and 'statistics.'
- (ii)** Stronger responses referred to the South African Weather Service data being more accurate or trustworthy and collected by people who were experts or professionals. Weaker responses

suggested advantages such as 'it would be quicker' or 'it would be easier' or 'the students would not need to do anything', which were not worth credit.

- (e) (i) Most candidates who attempted this question accurately plotted the temperature. Some weaker responses did not put the X at 30°, either because they selected the wrong figure from Table 1.2, or because they misread the temperature scale. Several candidates did not attempt to complete the graph.
- (ii) Most candidates correctly stated that Hypothesis 1 was false or that temperatures were higher in Cape Town. Stronger responses scored the separate mark by stating that both maximum and minimum temperatures were higher in Cape Town. Many candidates used the data to gain further credit: they compared average maximum and average minimum temperatures in the two cities, and highest and lowest daily temperatures. Weaker responses just referred to the average temperature, which did not gain credit as they needed to be clear whether they were referring to maximum or minimum temperatures. Some candidates only gave figures for individual dates, which were not accepted to support their conclusion about the general pattern of temperatures.
- (f) (i) Several candidates did not plot the rainfall bar. Those who did draw the bar were usually accurate. Some candidates made mistakes by drawing the bar to 8 or 9 or 9.5 mm, rather than the correct 8.5 mm.
- (ii) All candidates attempted the second hypothesis question, as they did on the first, i.e. **Question 1(e)(ii)**. Many candidates agreed with the students' decision that Hypothesis 2 was valid and supported their conclusion by stating that total rainfall was higher in Johannesburg, and that rainfall was recorded on more days in Johannesburg. Weaker responses missed out reference to 'total' rainfall and did not gain credit for this statement. Many candidates used comparative statistics from both cities to support their conclusion. They again compared statistics such as total rainfall, number of days with recorded rainfall, and highest daily rainfall figures. Some candidates calculated the average daily rainfall, which was also accepted.

Question 2

- (a) (i) The question was challenging for some candidates. Many who knew the term *systematic sampling* scored one mark by stating that it would involve asking the tenth or *n*th person. Stronger responses also described sampling at regular intervals or using a regular pattern. Some responses did not refer to 'regular' or 'even' intervals, which was required for credit. Candidates needed to be aware that 'asking one in ten people' is not the same as asking every tenth person.
- (ii) Many candidates had difficulty in explaining why sampling is a useful fieldwork technique. Stronger responses made valid suggestions such as avoiding bias, saving time or being representative so not needing to ask everybody. In contrast, weaker responses only suggested that sampling was an easy or reliable technique, which was too vague for credit.
- (b) (i) Most candidates gained some credit for drawing the correct arrows of appropriate thickness. Many candidates drew a single line from Thailand. Some candidates found it difficult to draw a line of correct width from Indonesia by using the key. Some drew a line which was thicker than the one from Singapore and was clearly inaccurate.
- (ii) Most candidates correctly identified that Hypothesis 1 was true; some did not support their conclusion with a valid statement. Most candidates scored one mark by identifying that *68 candidates came from Southeast Asia*. Some candidates incorrectly thought that China was part of Southeast Asia, but it was shown on Fig. 2.2 that it is outside this region.
- (c) (i) Stronger responses gave valid suggestions for the different scores, including reference to scores being subjective, the survey being done in different parts of the area or at different times, or the students coming from different backgrounds or with different expectations. Weaker responses did not understand that the students assessed the features themselves so gave irrelevant answers about asking other people and getting different scores from them.
- (ii) Some candidates did not understand that a bi-polar survey is done by the students themselves and not by asking other people, as is the case with a questionnaire. Stronger responses realised that the students carried out the survey themselves and included ideas about using agreed categories

of features, deciding when to do the survey, observing the features then deciding a score for each feature, and finally recording the score on the survey sheet.

- (d)(i) Most candidates completed the graph accurately. The main error was that some candidates did not accurately draw in all the lines between the category scores. A few candidates did not attempt to complete the graph.
- (ii) Most candidates correctly identified that Hypothesis 2 was *false* or *that visitors to Batu Caves spoil the environment more*. Stronger responses realised that the Kuala Lumpur Bird Park got higher ratings which suggested less damage was done to the environment. Some weaker responses misinterpreted the data and thought that higher scores meant that more damage was done so incorrectly agreed with the hypothesis. Many candidates gave correct supporting statistics, either total scores, average scores, or some comment about the pattern of scores: for example, 'at Kuala Lumpur Bird Park, most scores are 3 or 4, and at Batu Caves, most scores are 1 or 2'.
- (e)(i) Most candidates drew the bars accurately. A few candidates incorrectly drew the bar for Kuala Lumpur Botanical Gardens to 35 or 36 visits. Some weaker responses did not accurately go to the 60-visit line.
- (ii) Most candidates observed that human attractions were more popular and referred to more visits being made to human attractions. A common error was to refer to the number of visitors rather than visits, because candidates did not realise that visitors could name more than one attraction, and that Table 2.4 and Fig. 2.6 clearly identified the number of visits. Stronger responses included supporting statistics to compare the total number of visits to human and ecological attractions. Some referred specifically to Petronas Towers having the highest number of visits. Weaker responses only listed individual results of different attractions with no attempt to interpret what they meant.
- (f) Stronger responses described a variety of different advantages including job creation, bringing money into the economy or local people selling goods to tourists, the transfer or preservation of local culture, and improvements to local services and transport. Weaker responses only referred to jobs and income.

GEOGRAPHY

Paper 0460/42
Alternative to Coursework 42

Key messages

To perform well on this paper candidates should:

- When answering hypothesis questions that ask whether they agree or not, always give their opinion first before any supporting evidence: this will usually be 'Yes', 'No', or '*Partially*'/'*To some extent*'. If questions ask for answers to support their decision with data, then statistics must be used from the resources referred to. Data is quantitative; evidence can be qualitative or quantitative. If candidates make an incorrect conclusion to the hypothesis, they will gain no credit for the answer.
- When giving figures in an answer, always give the units if they are not stated.
- Read questions carefully and identify the command word, e.g. 'Describe', 'Explain', 'Suggest'.
- When asked to compare or make judgements, use terms such as 'higher', 'lower', rather than just listing comparative statistics. The use of 'only' with statistics is not accepted as a comparative statement.
- If comparing statistics, note that it is important to use paired data rather than one set on its own.
- Check that they are using the resources that the question refers to, e.g. 'Support your conclusion with evidence from Fig. 2.4 and Table 2.3'.
- Attempt all completion tasks on graphs, tables, or diagrams (not all the answers are on lines and in writing). Many candidates are missing out on marks by not attempting these questions.
- Consider the mark allocations. Examiners do not expect candidates to be writing outside of the lines provided, so candidates should not write a paragraph when only two lines are given as this wastes time.
- If candidates need to write more than the lines allow, indicate this with a phrase such as '(continued on additional page)'.
- When completing graph work, use a dark-coloured pencil or pen. They should use a ruler to draw lines. Candidates should always shade bar graphs and pie charts accurately. They should make sure their shading matches what is shown in the key.
- When they think that they have finished, check that they have not omitted a question. Some questions might have been overlooked if they are on pages with a lot of graphs or maps. Candidates should make sure that they have answered the questions on every page of the paper: this applies especially to questions where they are asked to complete tables, diagrams, graphs or maps.

General comments

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

Where candidates did not score well, it was often a case of their not fully reading the question or completely missing out straightforward graph completions.

Although this is an *Alternative to Coursework* examination, candidates are still expected to show that they know about fieldwork equipment, how it is used, and fieldwork techniques. Any fieldwork experience is worth giving, even if there is limited opportunity within the centre. Familiarity with maps, tables, sampling methods, measuring instruments and the various graphs and other refining techniques listed in the syllabus are also important for success in this examination. Sampling techniques remain an important part of fieldwork that can easily be taught and demonstrated within the classroom or school and yet they are not done well by many candidates. Measuring infiltration rates, for example, is one sort of fieldwork that could easily be carried out within most school grounds and would have helped with **Question 2**. Questionnaires and sampling exercises can be carried out and demonstrated without leaving the school, e.g. sampling of candidates using random, systematic or stratified techniques or using internal questionnaires.

Comments on specific questions

Question 1 focused on fieldwork in the city of Hanoi in Vietnam and an investigation into air pollution. Candidates needed to understand how to carry out traffic counts at sites close to and away from the CBD, how those numbers changed and how they might be related to air pollution measurements at the same sites. To test practical skills, they needed to complete a choice table outlining four important features of a traffic count, a horizontal bar graph showing vehicle numbers, and analyse an *Air Quality Index* table as well as complete a scatter graph relating vehicle numbers to the AQ Index. They were asked to make judgements about two hypotheses and then to justify those decisions with evidence.

- (a) (i) The vast majority of candidates knew the most important features of a traffic count. Most scored three or four marks; the main errors being to choose Row 8 instead of Row 1. Choosing Row 4 was also a common mistake. A small number gave less than (or more than) the four ticks required.
- (ii) Very few candidates gained marks here. Many thought that counting the vehicles for a limited time of ten minutes would make it more accurate or would stop the candidates getting too tired. Few recognised that measuring for ten minutes at each site at the same time would allow for comparisons between sites, would be reliable and be an appropriate time for them to keep their focus and concentration. Only a few referred to possible issues related to traffic fumes and heat. A few mistakenly thought one group was going to visit all nine sites in ninety minutes so that was why they would only take ten minutes at each site. Some thought ten minutes was an appropriate length of time to measure speed.
- (b) (i) Site 5 was correctly chosen by almost all candidates as the one where most vehicles were counted. Giving Site 2 was the most common error.
- (ii) Most completed the graph accurately with a correct horizontal bar plotted at 310. A few marked it at 320 or 410 and a small number did not attempt it or did not use the provided 'starter lines' to draw it.
- (iii) Most candidates did choose the correct decision of 'Partly true with some exceptions' for the hypothesis, but rarely could they justify it with reference to the evidence provided. The graph and table clearly suggested an overall trend of vehicle numbers decreasing from Site 1 (409 close to the CBD) to Site 9 (18 furthest from the CBD); however, there were also exceptions at Sites 2, 5 and 7. Most candidates gained a second mark by recognising that Site 5 was an exception (though the term was rarely used) as it had the highest number of vehicles at 616 and was away from the CBD; a few pointed out Site 7 was similar too. Overall, the use of data was not done well; quite a few answers gave general statements without any data which restricted the marks that could be awarded. Many just repeated the hypothesis as if it was a new statement. Others described traffic patterns in the city as people drove to work, school or shop.
- (c) The majority knew that secondary sources are those that had already been produced by other people, organisations or 'someone else'. The most common examples given included the internet, newspapers, textbooks and journals. Questionnaires, libraries and references to 'external sources' were not appropriate as examples. A few related secondary sources to secondary industry.
- (d) (i) Almost all candidates correctly chose 'very unhealthy'. A small number of answers were seen that chose 'hazardous', and some carelessly missed out the 'un' part of 'unhealthy'. A few missed out the 'very...' part of the correct answer. Some gave the colour purple instead of the level of health concern.
- (ii) Candidates needed to read all the advice text carefully before making their choice. The correct choice was 'Orange', but almost every colour on Fig. 1.2 was supplied in answers overall. While four colours did refer to 'reduce prolonged outdoor exercise' only the orange colour referred to 'Children...should reduce prolonged exercise'.
- (e) (i) Correct plotting of Sites 6 and 7 was needed for both marks here. It was important to add the Site numbers by the two plots to match the other plots to access both marks. Some gave accurate plots without the numbers, so were restricted to one mark maximum. While the majority did this well, some plots were carelessly located. A small number used dots instead of crosses.

- (ii) Most candidates answered that the hypothesis was true, and looking at the graph in (e)(i) it should have been clear that there was an almost perfect positive correlation between the *Number of vehicles counted* and the *Air Quality Index Value*. The best candidates agreed with the hypothesis, stated that one variable increasing caused the other to increase, and backed this up with paired data that proved this – usually using the figures from Site 9 and Site 5. Some referred to the highest Air Quality, which means low pollution, instead of the high *Air Quality Index*, which means high pollution; missing out the word *Index* reversed their intended meaning.
- (iii) The key to getting this right was to focus on the source of air pollution rather than processes. Burning fossil fuels is not a specific source; the factory or industry that does this is the source. Other acceptable answers included power stations, airports and untreated sewage. Inappropriate sources included a common misconception that people smoking cigarettes was a source of air pollution at the city scale. Litter was often seen as an answer. A few ignored the instruction which clearly stated, '**not** including traffic'. Candidates also suggested deforestation and burning trees, methane from cattle, field fires, light pollution, mining, greenhouse gases and water pollution – but none of these was likely to cause air pollution in a major city like Hanoi.
- (f) (i) Questions about the use of a bi-polar technique to compare environmental quality have been frequently used on this Paper, yet quite a few candidates regarded these as questionnaires and wrote extensively about how they would sample and ask people to complete the survey. To emphasise that the student was doing the survey alone, the question stated 'the student himself' to steer candidates down the route of not involving other people or groups/pairs of students. The better answers did give four clear stages to follow: filling in the detail at the top of the sheet, assessing and making judgements about the area using the descriptions for the –2 to +2 scales, giving a score, ticking the right box, and then adding up a total score. A maximum mark of two was available if candidates referred to the correct procedures but involved other people. A small number missed this out completely despite it being listed in the syllabus as a technique they should know about.
- (ii) Working with another candidate would allow two opinions to be discussed and lead to a better judgement by comparing scores, as correctly stated by the better answers. Saving time, visiting more sites, dividing the work and producing more accurate judgements were not acceptable benefits of working together that would produce more reliable results.

The point of doing all the surveys at the same time of day was so that results could be compared as they had been conducted either in the same weather and time conditions. A few candidates gave examples of variables that could change at different times, such as number of pedestrians, weather, vehicle noise and litter.

Not many candidates grasped the benefits of walking around the entire site before making a judgement about its score. Clearly making a judgement based at one point cannot take into account the whole area and could miss factors. A whole-site view would provide a more reliable judgement. A number were concerned about safety.

Question 2 appeared to be more challenging than **Question 1** and some candidates did not attempt responses in parts of it. The question was about studying infiltration and soil moisture content at different sites in a drainage basin. Its initial focus was on how to measure the rate of infiltration with stated equipment and comparing different rates at different sites. Candidates were expected to know how to calculate the infiltration rate and to consider the advantages of using one method against another. They were also required to complete one calculation and complete a line graph, bar graph and scatter graph. They also had to make judgements from evidence regarding two hypotheses.

- (a) Almost all candidates correctly chose Row 5 – *Water soaking into the soil*. All incorrect answers were also seen, especially choosing the definitions of percolation and overland flow.
- (b)(i) There were several stages of using the equipment shown in the diagram to measure infiltration; three were needed for the marks available. The method involved pushing a plastic tube *into* (not *on*) the ground or soil, filling it with water up to 120 mm, and then letting the water infiltrate while timing its progress or rate into the ground. As no time was stated at this stage of the question, it was acceptable to use the watch to time for a fixed period or until the water had completely infiltrated. Most candidates did pick out three stages for full marks. Weaker answers did not refer to pushing the tube into the soil and also thought the tube was filled with rainwater and the watch

timed how long it would take to reach 120 mm. Few mentioned using the scale on the tube. Some suggested stopping the watch every two minutes to check the level, not realising that the water would continue to infiltrate.

- (ii) While the majority plotted these two points correctly, a significant number did not attempt this at all. Some candidates seem to look at graphs and, if they *appear* complete, go straight to the next question which usually involves some analysis of the graph they have not completed. At the top of page 9 above the graph it says in emboldened text 'complete the measurements'. All questions need to be read carefully, and these are relatively easy marks to gain. An occasional error was made by taking 10 and 6 from the wrong axes, resulting in a rather odd line.
 - (iii) Even if candidates did not plot the two points in (ii), the rate of fall that was already drawn clearly shows that Site 4 had a greater/faster infiltration rate from 120 mm to 6 mm than Site 1 that fell from 120 mm to 105 mm. These numbers were on the Table so could have been quoted even if they were not plotted. Centres should note that if there is a Table with data and a graph with plots, the Table should be used for accurate data rather than inaccurately judging graph plots. A few candidates referred to Site 4 as Site 1 and Site 1 as Site 2 in their answers; presumably they regarded the left site as the first one and the right site as the second one.
 - (iv) The majority of candidates gave a correct formula – of which there could be several varieties. Some knew that one figure was divided by another, but figures were often incorrect. The best answers used $120-6/10$ or $114/10$.
- (c) (i) Most candidates did well on this. Answers invariably referred to the fact that Method 2 would be quicker, faster and instant; that it should be more exact, precise and accurate; and, as a third advantage, that it did not involve calculations or that it used less equipment. All of these were valid. What was not accepted though was that this method was cheaper or safer or that it required less labour. Some even suggested it would be very tiring for the students. It was important that candidates read the question carefully here: what was needed were the advantages of Method 2, not the disadvantages of Method 1. Comparing Methods was acceptable, but not absolute statements of Method 1's disadvantages.
- (ii) The 5.1 mm plot proved to be tricky, but the 31.5 per cent plot was more straightforward. Most candidates plotted both well, though a few did plot the cross where the bar should have been and vice versa; they also plotted at 31 per cent. Not all lined up the 31.5 per cent plot correctly above Site 3.
 - (iii) Most candidates agreed with the hypothesis and, in some cases, identified the relationship as a negative or inverse correlation. Sites 1 and 6 were the most popular choices to illustrate this, with paired data used to show that the infiltration rate increased when soil moisture content decreased and vice versa. A small number mixed up the correlations; having stated the hypothesis was true and given the correct data, they called it a positive correlation so did not gain the third mark.
- (d) (i) The question clearly asked for a method to measure the slope gradient. A few candidates, however, thought it was about measuring water velocity or infiltration rate down a slope, and wrote about how they would measure both parameters with mention of soil moisture meters and floats. Some described how to measure a beach profile. The better candidates did refer to the equipment they would use as asked, and usually began with two ranging poles either at a fixed distance apart or at the breaks of slope; the distances would be measured with a tape measure. Then a clinometer would be pointed at an equivalent mark on each ranging pole and the angle could be read off in degrees. A significant number did not attempt this question, yet the principles were the same as the frequently well-answered questions about measuring river velocity or gradient on previous papers. Candidates should remember that a clinometer measures the angle of slope, not the gradient – the latter has to be worked out.
- (ii) As the 5.1 mm plot was difficult given the scales used on the graph, a degree of tolerance was allowed in that if the plot was closer to 5.2 than 5.0 it was credited. Most managed this well. Adding the site number by the plot was not essential to score the mark. However, it would be good practice to match the others, and most candidates did identify it as Site 3. A few plotted the point above Sites 2 or 4.
 - (iii) Some candidates thought that the pattern shown on the graph in (ii) could suggest a relationship, even though the plots were scattered and random. Nevertheless, they thought the hypothesis was

True or Partly True. Even some of those who correctly thought it False then tried to prove there was a negative correlation when there was really none at all. The data mark was awarded for any paired data that went against the hypothesis and proved it could not be true – usually using figures from Sites 1 and 5.

- (e) It was not enough to state that more vegetation meant a higher infiltration rate; evidence of studying Fig. 1.2 was required. This showed that, as vegetation became denser, the infiltration rate increased, whereas with bare soil it was low. The use of contrasting data – i.e. 1.5 mm per min at Site 1 (scrub grass and bare soil) and 17.1 mm per min at Site 6 (dense grass and bush) – gained the second mark.
- (f) Few responses to this gained all three marks. The best answers showed understanding of how people walking in the area could reduce infiltration rate by damaging vegetation and compressing or compacting the soil such that it hardened and became bare. They also showed understanding that the pressure closed air spaces and gaps in the soil and so water could not infiltrate through. The lack of vegetation also meant that roots were no longer creating air spaces for water to infiltrate. The weaker answers could not link the impact of compression to a reduced infiltration rate and wrote about people eroding the soil, or shoes absorbing water or dropped litter making the surface impermeable.

GEOGRAPHY

<p>Paper 0460/43 Alternative to Coursework 43</p>

Key messages

To perform well on this paper candidates should:

- When answering hypothesis questions that ask whether they agree or not, always give their opinion first before any supporting evidence: this will usually be 'Yes', 'No', or '*Partially*'/'*To some extent*'. If questions ask for answers to support their decision with data, then statistics must be used from the resources referred to. Data is quantitative; evidence can be qualitative or quantitative. If candidates make an incorrect conclusion to the hypothesis, they will gain no credit for the answer.
- When giving figures in an answer, always give the units if they are not stated.
- Read questions carefully and identify the command word, e.g. 'Describe', 'Explain', 'Suggest'.
- When asked to compare or make judgements, use terms such as '*higher*', '*lower*', rather than just listing comparative statistics. The use of '*only*' with statistics is not accepted as a comparative statement.
- If comparing statistics, note that it is important to use paired data rather than one set on its own.
- Check that they are using the resources that the question refers to, e.g. 'Support your conclusion with evidence from Fig. 2.4 and Table 2.3'.
- Attempt all completion tasks on graphs, tables, or diagrams (not all the answers are on lines and in writing). Many candidates are missing out on marks by not attempting these questions.
- Consider the mark allocations. Examiners do not expect candidates to be writing outside of the lines provided, so candidates should not write a paragraph when only two lines are given as this wastes time.
- If candidates need to write more than the lines allow, indicate this with a phrase such as '*(continued on additional page)*'.
- When completing graph work, use a dark-coloured pencil or pen. Use a ruler to draw lines. Candidates should always shade bar graphs and pie charts accurately. They should make sure their shading matches those that are shown in the key.
- When they think that they have finished, check that they have not omitted a question. Some questions are hard to find if they are on pages with a lot of graphs or maps. Candidates should make sure that they have answered the questions on every page of the paper: this applies especially to questions where they are asked to complete tables, diagrams, graphs or maps.

General comments

All candidates achieved marks on the practical questions, such as drawing and interpreting graphs and tables. Stronger responses were also successful on the more challenging sections that required explanation and judgement, especially regarding hypotheses. **Question 1** and **2** were answered with an equal level of success overall.

As there are no choices to make, it is difficult to miss sections out, though some candidates omitted graph completion questions. Some candidates write too much in some sub-sections. Candidates should be encouraged to answer more succinctly and give more thought to their answers.

Most points for teachers to bear in mind when preparing candidates for future Paper 43 questions related to the misunderstanding or ignoring of command words, and to the use of appropriate fieldwork techniques and equipment.

Question 2(d)(ii) and **2(d)(iii)** required candidates to consider problems with a specific fieldwork method and **Question 1(e)** required candidates to suggest a suitable methodology to extend the fieldwork. These types of question are frequently included in 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 worth credit.

Although this is an *Alternative to Coursework* examination, candidates are 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 their centre: for example, **Questions 1(a), 1(c)(i), 1(c)(ii), 2(a)(i), 2(a)(ii) and 2(d)(i)** focused on specific equipment and techniques commonly used in fieldwork. Centres are encouraged to carry out basic fieldwork with candidates, especially using simple techniques which can be done on the school site or in the local area.

Where candidates did not score well, this was often related to their not having read the question carefully: for example, **Question 1(d)(ii)** where some candidates did not identify and describe the two largest differences, and **Question 2(d)(i)** where some candidates described how a flowmeter works rather than how it is used in fieldwork.

Comments on specific questions

Question 1

- (a)** Candidates were more successful in suggesting a disadvantage rather than an advantage. Candidates needed to think specifically about the method described in the question, rather than suggesting generic ideas. Popular suggestions for a disadvantage included the idea that the method of recording ground floor land use would miss land uses on upper floors, and recording land use every 100 metres might miss a typical land use of the area which would mean the results would not be representative of land use as a whole. The most common advantage suggested was that the method would result in there being no bias in the selection of land use as the methodology was clearly set out. Some candidates suggested that the method would be 'easy' but this needed qualifying to explain how it would be easy, such as 'easy to carry out' or 'easy to choose which land use to record'. Weaker answers included the idea that it would 'take too much time' but this was not accepted.
- (b)** Nearly all candidates could match the three examples of land use to the correct categories. Some candidates did not know what an apartment was, and this was sometimes included in the public buildings category. A few candidates wrongly suggested a general store was included in the services category.
- (c) (i)** Nearly all candidates correctly completed the tally chart based on the information in Fig. 1.2. A few candidates miscounted the number of entertainment buildings. Also, a few omitted the tally marks which were required for this exercise.
- (ii)** Most candidates understood the term 'pilot study' and there were few erroneous suggestions about using an aeroplane to get a 'bird's eye' view of the study site. The most common correct answers referred to practising fieldwork techniques, discovering possible errors, and knowing what to do in the actual fieldwork. Another stronger answer was that it would save time when doing the real fieldwork.
- (d) (i)** Most candidates completed the divided bar graph correctly. Some candidates did not gain any marks because they plotted the dividing lines inaccurately or reversed the order of the three segments. Candidates should always plot segments in the order of the key and the other completed bars. Some candidates did not attempt the question.
- (ii)** The strongest answers were clear and concise in describing that commercial land use was larger at site 1 than site 6 and residential land use was larger at site 6 than site 1. The most successful answers gave statistics to support these ideas. Some candidates stated with supporting statistics that 'commercial (shops)' was the largest land use at site 1 and 'residential' was the largest at site 6 so scored two marks. Candidates who only used statements or statistics to describe the differences also scored two marks. Some weaker answers incorrectly described areas which lacked particular land uses or compared the number of land uses at the two sites, but these were not the two largest differences.
- (iii)** The correct conclusion to Hypothesis 1 was that it was false because residential land use does not occupy most of the land area at all sites. Some candidates missed the important word 'all' and so suggested that the hypothesis was partly true. Although these candidates did not score the mark

for making a correct conclusion, they did gain up to three marks for appropriate evidence. Candidates recognised that residential land use occupied most land at sites 3 to 6 but not at sites 1 and 2. Stronger answers also stated that 'commercial (shops)' was the main land use at sites 1 and 2. Most candidates supported their decision with relevant statistics taken from either sites 1 or 2. Weaker answers only focused on sites 3 to 6 where residential land use does occupy most of the area and ignored sites 1 and 2.

- (iv) Stronger answers supported the 'partly true' conclusion to Hypothesis 2 well. They identified correctly that land used for industry increased from site 1 to site 6 but that it decreased at sites 4 and 5. They also supported their conclusion with correctly paired data taken from appropriate sites. However, some candidates did not score the data mark because they did not state which sites the percentages referred to. Some candidates described the pattern of industrial land use change site by site, commenting on increases and decreases as they went from site to site. Although they gained credit for this approach, it produced repetitive answers. Some candidates did not refer to site 6 which was crucial to show the overall change. Weaker answers only gave industrial land use statistics for the six sites with no commentary, so gained no credit.
- (v) This question was challenging for some candidates. The most common correct reasons suggested for land use change with increasing distance from the city centre were cost and availability of land. Stronger answers then linked these ideas to appropriate land uses to which these ideas applied, such as industrial and residential land use. Other less common suggestions referred to transport availability or access and the effects of planning policy. Some candidates confused the terms *urban* and *rural* and referred to land uses outside the city such as farming. Weaker answers missed the focus on land use change as the distance from the city centre increased, and they focused incorrectly on pollution, noise, demand for shops and entertainment.
- (e) The final part of **Question 1** tested candidates' knowledge or experience of fieldwork methodology. There was the opportunity for candidates to describe various methods to investigate change in environmental quality. The most successful approaches were from candidates who focused on either a bi-polar survey technique or questionnaire survey. Stronger answers described the bi-polar survey in detail with reference to agreeing categories to test, devising a scale and applying it to different features of the environment. Similarly, other stronger answers suggested appropriate questions to use in a questionnaire and a method to select people to interview. A few candidates described how measuring features of the environment such as noise, air pollution and litter could be done, although answers using this approach often lacked detail. Weaker answers gained some credit for general ideas about how to undertake fieldwork, such as choosing appropriate sites and recording results in a table: such answers were limited to two marks out of four. Typical weaker answers referred to various possible methods but gave no development of any techniques. Some candidates did not attempt the question.

Question 2

- (a) (i) Most candidates were familiar with the technique of measuring river velocity by using the equipment shown in Fig. 2.1. Answers were differentiated through their accuracy of the description. Stronger answers described the methodology sequentially from measuring a distance along the river to setting up the experiment, through to measuring the time taken for the orange to travel the measured distance. Weaker answers did not gain any marks because they did not show complete understanding of the method: for example, they suggested 'put the ranging poles in the river and measure the distance between them', 'let the orange travel downstream and measure how far it travels', 'put the poles at the side of the river and measure the distance across'. Some weaker answers described the pieces of equipment but did not explain accurately how they would be used to measure velocity: for example, they suggested to 'use the stopwatch to measure time'.
- (ii) The most common suggestions for measuring the velocity three times were to get an average measurement and reduce the impact of an anomalous measurement or measuring error. A few stronger answers also suggested that the velocity should be measured at different points across the river channel. Weaker answers suggested that the measurements would be 'more accurate', but this was not accepted as a reason.
- (iii) Most candidates drew the bar accurately. Some candidates did not attempt the question. A few candidates did not gain any marks because they drew the bar carelessly and did not finish at the 0.4 m / sec line.

- (iv) Many candidates scored both marks. Stronger answers recognised that velocity decreased downstream (thus not agreeing with Hypothesis 1) and gave paired supporting statistics from identified sites 1 or 2 and site 4. Weaker answers just listed the velocity statistics from the four sites with no attempt to identify the trend, so gained no marks.
- (b)(i) Few candidates answered this question successfully. Candidates suggested valid examples of human impact but did not explain how these would impact river velocity: for example, they needed to state that building a dam across the river would reduce its velocity downstream. The most popular stronger suggestion was that 'waste or litter dumped in a river would slow its velocity'. Some candidates misread the question and wrote incorrectly about how carrying out fieldwork in a river would affect its velocity by 'students standing in the river', or 'students timed incorrectly when the orange travelled downstream'.
- (ii) Generally, candidates were more successful in describing how natural river features could increase its velocity. The most common correct answers referred to a waterfall or steeper gradient, or the joining of tributaries. Some stronger answers described how velocity was faster on the outside of a meander or when a channel was straightened because of cutting off a meander to form an oxbow lake. Many candidates suggested ideas about river load, wider or deeper channel, and river discharge, which were too vague for credit. Some weaker answers described rainfall or snowmelt or evaporation due to high temperatures, ignoring the question focus on the river channel.
- (c)(i) The quality of answers varied. Most candidates gained at least one mark. A few did not write an answer, despite the presence of the photograph of the callipers in Fig. 2.3. Some stronger answers stated that a pebble would be put into the 'teeth' of the callipers. Many candidates used different words to express this idea, which were accepted. Weaker answers only wrote that the pebble was 'put into the callipers', which was not accepted. Many candidates extended their description by referring to how the callipers would be adjusted to hold the pebble so it could be measured accurately. Many candidates referred to getting the measurement from the callipers; weaker answers did not describe clearly how this would be done by looking at the scale or ruler. Some candidates also stated that before using the callipers, the student should identify which was the longest axis or longest side of the pebble.
- (ii) Most candidates completed the histogram accurately. A few did not attempt the question. Weaker answers made errors through miscounting the number of pebbles in each category, rather than through misinterpreting the scale of the graph.
- (iii) Most candidates made the correct conclusion that Hypothesis 2 was generally true, and they identified the general decrease in size downstream or from site 1 to site 4. Stronger answers also identified that there was an anomaly to this general pattern between sites 2 and 3 where bedload increased in size: they supported these ideas with relevant data from specific sites. Most candidates used the data about the average length of bedload at the four sites. Some candidates also used data from the histogram, which was equally valid, though more difficult to describe. Weaker answers selected data from the histogram which was not relevant to the general trend or anomaly.
- (d)(i) Most candidates were able to refer to the diagram of the flowmeter in Fig. 2.5 to describe how it would be used. A few candidates did not attempt the question. Stronger answers described putting the flowmeter or propeller into the river with the propeller facing upstream, then getting the measurement from the reading on the velocity display. Some candidates also referred to making sure that the river flow was not blocked from moving the propeller. Weaker answers were vague in their descriptions, such as 'look at the display screen' or 'take more readings'. Some answers contained irrelevant information about how a flowmeter works, rather than how it is used by students. Some candidates showed no understanding of the method and wrote about putting the velocity display into the river or floating the pole downstream.
- (ii) This question was challenging for some candidates. Successful answers focused on the reliability of the flowmeter: they suggested that measurements would be more accurate and less affected by obstacles in the river and using a flowmeter would mean there was no chance of measuring distance incorrectly or making an error in timing. Some candidates suggested that there was less opportunity for human error, but they did not specify what the error might be. Other candidates focused on how an orange might be affected by variations in the river flow, such as 'it gets stuck behind a rock': this was not accepted without reference being made to the flowmeter not being affected.

- (iii) Some candidates showed little understanding of the weakness of selecting pebbles at random. The most common correct answers referred to the ideas that random selection could mean that the pebbles selected were not representative of the ones at the site, or that the students could be biased in choosing pebbles to measure. Weaker answers wrote about pebbles being broken or having been thrown into the river, which showed no understanding of the weakness or random selection. A few candidates did not attempt the question.
- (e) A few candidates did not attempt an answer. Stronger answers correctly identified the two characteristics.