GEOGRAPHY

Paper 2217/12
Paper 12

Key messages

In order for candidates to perform well on this paper they needed to be able to:

ensure that the examination rubric is followed correctly, answering three questions, one from each section
select the three questions with care. Read them all through and study the resources provided with them before making a choice
answer all parts of the three chosen questions and ensure that sub-sections are not missed
read the questions carefully. If it helps to do so, underline command words and words which indicate the context of the question
have the correct equipment for the examination, including a ruler and a calculator
respond in the correct way to command words used in questions – for example, 'describe'; 'suggest reasons'; 'explain'
identify the correct focus specified in the question stem – for example, causes or impacts; problems or strategies; local, national or global; environmental or social
ensure that they respond correctly to key words and learn the meanings of geographical words and phrases in order to be able to define and accurately use geographical terminology. When defining words or phrases, candidates should not simply repeat a word or words as part of their definition
use the mark allocations and answer space provided in the question and answer booklet as a guide to the length of answer required and the number of clear points that need to be made
write as clearly and precisely as possible avoiding vague, general statements
write in full wherever possible, especially in the final two parts of each question, ensuring that ideas are developed with the correct focus
perform basic skills using population pyramids, graphs, data tables, photographs, text, diagrams and maps of various types, referring to them in an appropriate way to support ideas rather than directly lifting material from them without any interpretation. Ensure that evidence is given where required to support an answer and that best use is made 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
if the rubric of a question instructs candidates to base their answer only on the information in a given figure, then answers that do not relate to that resource should not be included as they will not gain credit
have a range of case studies so that appropriate ones can be chosen for the topics tested
ensure that each case study used is at the correct scale. The syllabus identifies the scale required for each case study
avoid writing a long introduction to any question (e.g. to provide locational information) at the expense of answering it in detail
develop points and link ideas wherever possible in case studies and include place detail
ensure that comparative language and phrases are used where a question requires a candidate to compare
ensure knowledge of physical processes and an ability to explain a process, using key terms and clearly sequenced ideas
write in detail and develop ideas in five mark questions where development marks are available
when 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. Candidates should continue answers on the specified continuation pages rather than inside the answer booklet or on extra sheets of paper

General comments

The examination was considered appropriate for the age and ability range of candidates and it differentiated effectively between candidates of all ability levels. The stronger candidates performed well across the paper and a number of excellent scripts were seen. Weaker responses were characterised by not interpreting questions correctly and write relevant answers. Candidates seemed to have sufficient time to complete the paper, however the final parts of the later questions were not always completed. The omission of other sections earlier in the paper however, suggested that lack of time was not an issue.

Most candidates followed the rubric by selecting a question from each section as required. Occasional rubric errors were still seen and a reminder to candidates to answer one question from each section is always helpful. Where candidates answer every question, this compromises the time available for each question and disadvantages them.

The presentation of answers from candidates was variable, though almost all were legible.

Questions 1, **4** and **6** were the most popular questions. There were good answers seen to all questions, including those requiring extended writing. The case study questions that were answered the most successfully were about the problems of an increase in the dependent population and the characteristics of an area of tropical rainforest (**1(c)** and **4(c)**). High quality answers in these case studies were characterized by developed ideas, with some clear place detail. Weaker responses tended to be generic developments of ideas with little place detail to support them, whilst other weak responses were characterized by the use of simple, brief statements. In some cases a significant amount of detail included by candidates was not relevant to the question being asked, and sometimes long introductions occupied much of the answer space. An area for improvement for some candidates would be maximizing the marks scored on the part **(c)** questions.

Case studies usually require place specific information to allow candidates to access the highest level. This requirement can vary between questions – for example: a country (**Question 1**) or an urban area (**Question 2**), an area (**Question 4** and **Question 6**). Candidates should carefully consider their choice for each question ensuring that they select an appropriate example and also that they have included appropriate place specific detail.

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

Comments on specific questions

Question 1

This was far more popular than **Question 2** with the vast majority of candidates attempting this question.

(a) (i) Some candidates did correctly interpret the graph, however many added numbers for male and female resulting in answers of 12 000+. There were also many who did not read the scale accurately enough, giving answers such as 6200 or answers using the wrong units such as 6.4, 6 or 0.64.

(ii) Most candidates recognised that there were more young dependents in Bihar, although a small number ignored the scale and put this the wrong way round. Lots of candidates gave statistics and lots of candidates made references to differences between males and females, neither of which were required. Where candidates did try to make references to the contrast in the balance of the age groups of young dependents, they were not always precise enough for the second mark.

(iii) Most candidates recognised the wide base for the first mark. Rural depopulation was less well interpreted and many candidates made reference to old dependents here. Some referred to the shape of the pyramid, but often these were vague references such as 'gets thin at the top'. Most candidates recognised that there were more males, though some clearly did not know the word 'imbalance'. Some candidates gave reasons for high birth rate, rural depopulation and the gender imbalance without making any reference to the evidence in the population pyramid.

(iv) Most candidates were able to achieve some success with this question and many answered it well, giving a wide range of reasons. The full range of marks was seen. The most common answers seen to explain the high birth rates were lack of contraception and/or education about it. Some candidates did not include sufficient detail – for example writing about 'improved education' rather than improved education for women or education about the disadvantages of larger families, or simply wrote words such as 'tradition' and 'religion' without any elaboration.

(b) (i) Dependency ratio is calculated by adding together young and old dependents, dividing that by the economically active, then multiplying by 100 so the ratio is expressed as the number of 'dependents' per 100 people.

This was a challenging question, although some candidates did correctly address the subject of dependency ratio and a few were able to make accurate calculations. However many candidates only made a simple comparison of numbers of young and old dependents, using statistics or words like 'increase' and 'decrease'. Only one mark was available for this approach unless it addressed dependency ratio directly. In the case of Bihar the overall dependency is likely to fall by 2050 according to the data in Fig. 1.3.

(ii) This question differentiated well and there were some high scoring answers which accessed the full range of mark scheme points. There were also good examples of development seen and some candidates were clearly well prepared for this question. However, there were many weaker responses that did not show understanding. A significant number simply wrote about the current young and economically active populations growing older without any reasoning which could be credited.

(c) Responses to this cases study were good and indicate that it was one candidates found relatively straightforward.. There was a variety of case studies, but the most popular and successful examples used were Japan and Italy. The stronger responses were able to make three well developed points - usually relating to pensions, health care or the workforce – and added some place specific detail, often of a statistical nature. Weaker responses gave simple, undeveloped and often generic ideas and sometimes focused incorrectly on overpopulation rather than an increase in the dependent population. Some tried to adapt their China 'one child policy' case studies to this question, usually with limited success. Better candidates focussed on old or young dependents, usually old, and described the problems associated with catering for an increased proportion of them.

Question 2

Only a very small number of candidates answered this question and it was far less popular than **Question 1**.

(a) (i) Most candidates identified the correct features.

(ii) Most candidates correctly identified the two urban areas.

(iii) This question was well answered and most candidates identified Calgary, justifying their choice using information from Fig. 2.1. A few simply quoted statistics without the required interpretation, i.e. 'lowest unemployment'.

(iv) Answers varied in quality. Common acceptable answers included lack of housing, traffic congestion and unemployment. Many weaker answers included reference to problems such as disease, food shortage and the growth of squatter settlements rather than problems resulting from the growth of an urban area in an MEDC, along with vague references to crime and living standards.

(b) (i) Responses to this question were mixed. Many candidates referred to accidents, angry drivers and lateness, however others relied on just one of these ideas.

(ii) This question was not well answered despite a wide range of ideas being possible. Candidates did not always pick up on the 'public transport' context. There were a few strong answers which tended to refer to developments in the bus and rail network, however most candidates who were able to interpret the question correctly did not give more than one or two mark scheme points, with few developing their ideas. Many candidates who missed the required focus on public transport wrote about ways to reduce traffic congestion, such as road improvements.

(c) Whilst a small number of high quality answers were seen, in general the question was not well answered. There were few developed answers which contained place specific information even though many candidates chose cities familiar to them, perhaps where they lived or at least within their own country. Many candidates did not clearly describe a change in land use by referring to the land use before and after (e.g. the destruction of housing to build a factory, the demolition of a factory to build a shopping mall). In addition many answers were vague and included conflicts, or more likely problems, relating to the natural environment, especially in rural areas rather than within an urban area.

Question 3

This was a less popular question than **Question 4**.

(a) (i) There were mixed responses to this question. Whilst 'spit' was the most common response given, a large number of candidates did not answer this correctly, a significant number choosing both distracters. There is a need for candidates to learn the names of landform types and be able to recognise them on maps and in photographs.

(ii) Again, responses to this question were mixed. Some candidates full marks both marks because they were able to give accurate distances and directions, others were not able to demonstrate these simple skills.

(iii) There seemed to be some confusion here and few candidates were able to give a clear sequence, with appropriate key terms, to gain full credit. Many responses focussed on erosion and failed to score. Candidates should be taught to explain processes, such as longshore drift, in a clear, step by step sequence with accurate use of key terms.

(iv) The question differentiated well. Good answers gave logical explanations of the stages in dune formation with weaker responses being vague, referring only in very brief terms to the build-up of sand. Significant numbers of candidates confused wind and wave action and wrote about swash and backwash.

(b) (i) Most candidates used the images well to identify three different opportunities, though some focussed on one idea only, particularly tourism.

(ii) This question differentiated well. Stronger responses described problems under appropriate headings without repetition, most candidates gaining credit for one or more ideas based on injury or death, destruction of houses or businesses, and loss of farming land or its impact on farmers. Weak answers tended to be vague or repetitive, however there was also some good development seen from the strongest candidates.

(c) Whilst a small number of excellent answers were seen the process was not well explained by many candidates. It was rare to see an answer which included explanation of erosional processes and a logical sequence of processes leading to the formation of the wave-cut platform. Many candidates focussed only on cliff collapse, often following the hard and soft rock sequence which was not wanted. Other answers provided the cave, arch and stack sequence but with no reference to cliff erosion or the resulting wave-cut platform, and some candidates wrote about rivers, waterfalls and plunge pools.

Most candidates included diagrams, but only a few were of good quality, helping to show understanding of the formation of the features

Question 4

This question was chosen by many candidates.

(a)(i) Some candidates failed to answer this question however many did correctly shade the required area. A significant number of candidates confused the Tropic of Capricorn with the international boundary so only shaded up to the dashed line. Others missed the 0–50 mm area or the area above 200 mm in their shading.

(ii) This question asked about the desert 'climate' however many candidates described other characteristics of a desert, such as its vegetation. Those who correctly interpreted the question typically scored marked for reference to the high daytime temperatures and low temperatures at night.

(iii) Responses to this question were characterised by a lack of understanding of how the factors explain the presence of a desert in Namibia. Some mentioned the Tropic of Capricorn or its significance, however many referred wrongly to the Equator or used inappropriate terminology such as 'below the Tropic of Capricorn'. Few responses showed an understanding of the significance of the wind direction (i.e. it blows overland to the deserts) and many did not appear to be familiar with the impact of a cold ocean current on climate.

(iv) There were some good answers which explained the rain shadow effect logically and fully, scoring maximum credit. However, most answers contained misconceptions such as the mountains 'block the rain', lack of vegetation prevents it, or strangely that a desert is the result of plate movement.

(b) (i) Many candidates scored three marks by correctly identifying three links in the food web. Some candidates however only repeated the words 'depend on' and so gained no credit as they did not describe how they were dependent (eg for a food supply). Other candidates repeated the same idea three times using different animals.

(ii) This differentiated well as many candidates referred to aspects of roots, leaves/cuticles and thorns. Some gave named examples and some gave explanations, neither of which were required as the command word was simply 'describe'. The stronger responses described a number of features, some of which they developed, however weaker answers tended to focus on one or two features, especially the leaves, and included irrelevant explanation.

(c) Most candidates named the Amazon but there was little place detail to take them to level 3. Where candidates linked a characteristic with a simple explanation they scored well, typically for emergents, buttress roots and drip tips. Weaker responses described at length but did not give clear explanations of how the vegetation adapted to the climate. Some answers included irrelevant details about human effects on the tropical rainforest whilst others continued to write about the vegetation in deserts.

Question 5

This question was answered by a significant number of candidates but was less popular than **Question 6**.

(a) (i) Most candidates identified a primary industry.

(ii) Generally answered correctly although some choices for manufacturing were incorrect or too vague, e.g. 'factory'.

(iii) This was generally answered well and a significant number of candidates scored full credit here. The main issue was that some answers did not compare or simply quoted statistics without any interpretation.

(iv) On the whole, this question was poorly understood and a significant number of candidates scored low marks. Where candidates did gain credit, it was typically for ideas relating to mechanization and/or improved skills/education. High quality answers were relatively few and they were characterized by reference to a range of different ideas in the mark scheme, some of which were developed.

(b) (i) Generally this was not well answered as many candidates used the vague phrase 'near to' for each locating factor rather than using distance or direction correctly. When describing a location a mark can be gained for reference to each of the correct distance and direction from any named feature but not for words like 'near' or 'close'. Some candidates here gave reasons for the choice of location instead of just describing the location itself. Unfortunately, where candidates did give reasons in **(i)** some didn't then go on to give the same reasons where they would have been relevant in **(ii)**.

(ii) This was a challenging question but it discriminated well. Stronger responses linked the factor with a benefit or developed reason, with answers usually focussing on raw materials, transport of products and workforce. Weaker responses wrote in general terms about location factors rather than relating their answer to the named industries or the specific example shown.

(c) Common case studies were Germany, Iceland, USA, and China. Many candidates seemed to struggle with the reference to 'importance' and included explanation at the expense of description. Many could list energy sources and give place specific references however this did not provide the development required to progress beyond level 1. Some were able to provide statistics, such as percentages of energy produced by different sources, the latter assisting them to describe their relative importance and raise the quality of their answers.

Question 6

This question was chosen by many candidates.

(a) (i) There was lots of variation seen in the quality of definitions here – many were precise and accurate however others defined 'migrant' or omitted the 'leisure/vacation' element of visiting a location.

(ii) Most candidates managed this well with only a few inaccurately plotted points or missing lines.

(iii) Many candidates made good use of Fig. 6.1 to identify an increase in numbers, some elaborating by accurately quoting statistics and referring to the rapid rate of increase. Significant numbers referred to air travel or attempted to compare which was not required as the command word was 'describe'.

(b) (i) Many candidates suggested jobs, whilst others included benefits such as increased sales or revenue from businesses (or examples), road improvements and cultural preservation. Significant numbers suggested foreign currency, development or benefits to the economy but did not say how this would benefit people. A common error was to give three examples of different jobs (or businesses from which earnings will increase) rather than considering different ways in which people will benefit as required by the question.

(ii) This question allowed good discrimination. Problems for people were better answered than for the environment though many responses were vague (i.e. crime, drugs, overcrowding, shortage of resources) and did not elaborate sufficiently for any credit. Stronger responses typically referred to noise, traffic congestion and loss of living/farming space. A lot of candidates used the words 'natural environment' instead of stating exactly what aspect of it they were referring to (i.e. 'natural environment will be ruined'). Correct answers typically referred to deforestation and water pollution. Littering was frequently referenced in this section but no impact on the environment was suggested.

(iii) This question was answered quite well by many candidates with many mark scheme ideas seen from candidates who made effective use of the various sources. Some lacked specific detail, including lots of value judgements instead, such as 'beautiful' 'amazing' 'idyllic' 'incredible' and 'breathtaking'. There were also many irrelevant references to transport features such as roads and airports, which are unlikely in themselves to attract visitors to the island.

(c) Many different examples were seen and most of these were valid except those who named an entire country. Common locations which were suggested included the Great Barrier Reef and Victoria Falls. Despite the focus on management in the question many candidates focussed on the impacts of tourism and seemed to refer to management as an afterthought, usually simple ideas such as litter bins and fines for dropping litter at level 1. Stronger responses, included ideas about restricting access to areas, establishing nature reserves and educating tourists about how to conduct themselves, some attempting to develop them more fully.

GEOGRAPHY

Paper 2217/13
Paper 13

Key messages

In order for candidates to perform well on this paper they needed to be able to:

ensure that the examination rubric is followed correctly, answering three questions, one from each section.
select the three questions with care. Read them all through and study the resources provided with them before making a choice.
answer all parts of the three chosen questions and ensure that sub-sections are not missed.
read the questions carefully. If it helps to do so, underline command words and words which indicate the context of the question.
have the correct equipment for the examination including a ruler and a calculator.
respond in the correct way to command words used in questions – for example, 'describe'; 'suggest reasons'; 'explain'.
identify the correct focus specified in the question stem – for example, causes or impacts; problems or strategies; local, national or global; environmental or social.
ensure that they respond correctly to key words and learn the meanings of geographical words and phrases in order to be able to define and accurately use geographical terminology. When defining words or phrases, candidates should not simply repeat a word or words as part of their definition.
use the mark allocations and answer space provided in the question and answer booklet as a guide to the length of answer required and the number of clear points that need to be made.
write as clearly and precisely as possible avoiding vague, general statements.
write in full wherever possible, especially in the final two parts of each question, ensuring that ideas are developed with the correct focus.
perform basic skills using population pyramids, graphs, data tables, photographs, text, diagrams and maps of various types, referring to them in an appropriate way to support ideas rather than directly lifting material from them without any interpretation. Ensure that evidence is given where required to support an answer and that best use is made 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.
if the rubric of a question instructs candidates to base their answer only on the information in a given figure, then answers that do not relate to that resource should not be included as they will not gain credit.
have a range of case studies so that appropriate ones can be chosen for the topics tested.
ensure that each case study used is at the correct scale. The syllabus identifies the scale required for each case study.
avoid writing a long introduction to any question (e.g. to provide locational information) at the expense of answering it in detail.
develop points and link ideas wherever possible in case studies and include place detail.
ensure that comparative language and phrases are used where a question requires a candidate to compare.
ensure knowledge of physical processes and an ability to explain a process, using key terms and clearly sequenced ideas.
write in detail and develop ideas in 5 mark questions where development marks are available.
when 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. Candidates should continue answers on the specified continuation pages rather than inside the answer booklet or on extra sheets of paper.

General comments

The examination was considered appropriate for the age and ability range of candidates and it differentiated effectively between candidates of all ability levels. Candidates seemed to have sufficient time to complete the paper; however the final parts of the later questions were not always completed. The omission of other sections earlier in the paper however, suggested that lack of time was not an issue.

Most candidates followed the rubric by selecting a question from each section as required. Occasional rubric errors were still seen and a reminder to candidates to answer one question from each section is always helpful. Where candidates answer every question, this compromises the time available for each question and disadvantages them.

The presentation of answers from candidates was variable, though almost all were legible.

Questions 1 and **3** were the most popular questions within the first two sections. Responses to **Question 5** and **6** were quite balanced. There were good answers seen to all questions, including those requiring extended writing. The case study questions that were answered the most successfully were about the reasons for high natural population growth rate and the advantages and disadvantages of TNCs for their country of location (**1(c)** and **5(c)**). High quality answers in these case studies were characterised by developed ideas with some clear place detail. Weaker responses tended to be generic developments of ideas with little place detail to support them, whilst other responses were characterised by the use of simple, brief statements. In some cases a significant amount of detail included by candidates was not relevant to the question being asked, and sometimes long introductions occupied much of the answer space. An area for improvement for some candidates would be maximizing the marks scored on the part **(c)** questions.

Case studies require place specific information to allow candidates to access the highest level. This requirement can vary between questions – for example: a country (**Question 1**) or an urban area (**Question 2**), a river (**Question 3**) or an area of coast (**Question 4**). Candidates should carefully consider their choice for each question ensuring that they select an appropriate example and also that they have included appropriate place specific detail.

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

Comments on specific questions

Question 1

This was generally more popular than **Question 2** with more candidates attempting this question.

(a) (i) The majority of candidates were able to correctly define population density, however a significant number of candidates incorrectly chose the statement that it was how large the population is.

(ii) Most candidates were able to correctly calculate the population density of St. Lucia and also showed their calculations.

(iii) This was mostly answered correctly. Occasionally candidates incorrectly stated that Trinidad and Tobago had the highest total population or was the largest island, and did not perhaps look at the whole of the map.

(iv) This question was not well answered and candidates gave a whole range of answers, many incorrectly focussing on reasons for high natural population increase. The strongest responses were able to achieve some success with this question and considered factors such as variations in relief and economic opportunities. The full range of marks was seen.

(b) (i) This question was not well answered with many candidates listing individual countries such as Canada or whole continents such as North America rather than stating regions such as the North of North America. Latitude was often weakly described with candidates stating that areas were above or below the tropics which did not gain credit. Few candidates identified that the distribution was unevenly spread or that there were many areas in high latitudes or polar areas. Some candidates gave reasons for the distribution rather than describing it and so gained no credit.

(ii) This question differentiated well and there were some high scoring answers which accessed the full range of mark scheme points. Many candidates referred to types of climate which would restrict crop growth, such as cold or dry climates. Some candidates however simply referred to harsh or extreme climates without stating what made the climate harsh, or did not develop their explanations of how cold or dry climates limit human activity.

(c) This question was well answered, and candidates found this a straightforward case study and it achieved the full range of marks. The strongest responses selected a suitable LEDC case study, made three well developed points as to why birth rates are high and/or death rates are low or falling and included some place specific detail, often relevant statistics. Weaker responses gave simple, undeveloped and often generic ideas, often naming MEDCs which do not have high natural growth rates or incorrectly tried to apply their knowledge of China's one Child Policy which gained little if any credit.

Question 2

This question was slightly less popular than **Question 1**.

(a) (i) The majority of candidates correctly identified the feature typical of urban areas.

(ii) The majority of candidates put the names of the countries in the correct rank order.

(iii) Where candidates correctly identified the distributions they were comparing they answered this well. This question was better answered than **Question 1(b)(i)**. Candidates however need to be aware that Australia is a country whilst Australasia or Oceania is the continent, as the distribution should refer to continents or parts of continents rather than countries.

(iv) This question was not well answered by most candidates. Responses did not show an understanding of the concept that urbanisation has already occurred in MEDCs and so the idea of rural-urban migration and the push or pull factors responsible for this are not relevant. Where candidates did gain credit it was for the idea that many people work in agriculture in LEDCs and so are in rural areas, or the concentration of tertiary industries is in urban areas in MEDCs.

(b) (i) The majority of candidates correctly identified the urban services in the photographs.

(ii) Most candidates gave a whole range of relevant problems faced by new migrants to urban areas in LEDCS. Some candidates however incorrectly considered international migration and so ideas such as language problems would not be relevant. Candidates need to be aware that ideas such as air pollution need to be developed to explain the problem it causes the migrants, such as breathing problems or asthma. Ideas such as no food were also not credited, as it is the lack of money to pay for the food rather than a shortage of food in the city as a whole.

(c) This question discriminated well. Stronger responses referred to self-help schemes or sites and services schemes in the clear context of a named LEDC city. Many candidates however only made simple reference to strategies such as improving water or electricity supplies without a clear explanation of how this was done and so did not go beyond Level 1.

Question 3

This was a popular question and was answered by a significant number of candidates.

(a) (i) There were mixed responses to this question. Whilst many candidates were able to give a clear definition, a surprising number of candidates did not answer this correctly. There is a need for candidates to learn the meaning of key terms more carefully.

(ii) Again, responses to this question were mixed. Many candidates correctly stated that wind direction is measured by a wind vane, however many were unable to explain that it indicates the direction that the wind is blowing from rather than to.

(iii) Most candidates correctly identified that a barometer measures air pressure and a thermometer measures temperature however many did not know that an anemometer measures wind speed.

(iv) This question required candidates to describe the differences in the weather on two dates. Whilst a significant number did this well there were some candidates who simply gave the data for the two dates but did not describe the differences in words and so did not gain credit. A number of candidates were unable to state the wind direction as WSW on the 29th March. Candidates should be able to use the sixteen points of a compass.

(b) (i) Some candidates gained full marks using accurate compass directions to describe the location of the highest rainfall isohyet. However many candidates were unable to describe the location accurately and used simple descriptions such as near Suva which did not gain credit.

(ii) This question differentiated well and some high scoring answers were seen. Most candidates understood the question and were able to make some relevant points. Some candidates simply described the rain gauge rather than how it is used, though many correctly stated relevant siting factors.

(c) Most candidates named appropriate examples and some detailed local knowledge was also demonstrated. Many candidates were able to make developed points about damage to homes and impacts on farmland and where good place specific detail was given they achieved full marks. However a significant number of answers remained at level 1 as most ideas were simple such as loss of homes and death or injury to people or farm animals.

Question 4

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

(a) (i) Many candidates were able to define the term coastal erosion, however some were unable to define erosion as the breaking away or wearing down of the land. Candidates need to be able to use terms other than the words in the key term to fully illustrate their understanding.

(ii) Some candidates gained both marks here, however many correctly identified that Y was protected or sheltered by land but did not state that X was exposed to wind or waves. Few candidates considered the impact of the fetch on the coastline.

(iii) Many candidates used the photograph well and gave valid descriptive points such as the colour or layering or steepness, however a significant number of candidates instead explained the formation of the landform and so did not gain credit.

(iv) Responses to this question were mixed. Whilst there were some good answers with relevant erosional processes and the idea of the notch cut at the base and subsequent collapse and retreat of the cliff, it was clear that many candidates did not understand the sequence which resulted in the formation of wave cut platforms. Candidates should be taught to explain the formation of features such as wave cut platforms in a clear, step by step sequence with accurate use of key terms.

(b) (i) Most candidates explained how the different methods of coastal protection worked rather than giving a description of the materials, structure and location and so did not gain credit here.

(ii) Candidates found this question challenging and it differentiated well. Some candidates were able to identify how their chosen method of coastal protection would work and its advantages and

disadvantages with comparisons with other methods. Weaker candidates did not go much beyond a simple description of their chosen method.

(c) There was similar performance to **Question 3(c)** with many candidates making simple points and achieving marks within Level 1. Most candidates did show some understanding of the dangers arising from a coastal location but few were able to describe the risk in detail using valid locational detail to support their answer.

Question 5

Responses to **Questions 5** and **6** were quite balanced in terms of numbers of candidates answering them.

(a) (i) The majority of candidates correctly identified the HDI of Uruguay from the maps.

(ii) Again the vast majority of candidates used the maps well and answered this question correctly.

(iii) This was generally answered well and many candidates gained all three marks here.

(iv) This question differentiated well. This question could be approached with reference to the indicators of development included in HDI, or an explanation of how this might be achieved. Weaker candidates struggled and referred to for example better schools or better health care with no suggestion as to how this could be achieved, such as building more schools or having more doctors and nurses.

(b) (i) Most candidates were able to describe the relationship and referred to the GDP and energy use of two contrasting exemplar countries. Fewer candidates were able to identify that this is a positive relationship or correlation, or to state that the relationship Is not a perfect one.

(ii) This question discriminated well with some excellent answers referring to a variety of mark scheme ideas, some of which were developed, for example transport or power in the home. Weaker responses tended to simply consider the idea of being able to afford energy or giving a whole list of electrical appliances without developing their ideas sufficiently well.

(c) Where candidates understood that the question was about impacts on the host country rather than the TNC they made a variety of valid developed points such as employment, economic growth and tax receipts and considered issues such as the exploitation of labour. Answers which were solely from the perspective of the TNC rarely gained any credit. Little place detail was seen, apart from general statistics which were often not convincing enough for credit,

Question 6

(a) (i) A large number of candidates answered this correctly although some candidates were possibly unfamiliar with triangular graphs and did not attempt to answer this question.

(ii) Well answered with a wide variety of exemplar occupations.

(iii) Most candidates answered this well using comparative wording such as higher or lower, however some candidates simply quoted figures which did not gain credit as there was no comparison made between the two countries beyond the repetition of data.

(iv) Answers were varied and the question discriminated well. References to differences in education and skills, technology or farming were common correct responses, with weaker candidates just focussing on one of these ideas. Candidates need to be able to consider other ideas such as the exhaustion of raw materials leading to a decline in primary industry, or a lack of money to set up factories in some LEDCs.

(b) (i) Many candidates gained one or two marks here, with most understanding that components are put together rather than raw materials being processed. Use of the word ‘assemble’ or ‘assembly line’ was not credited as candidates need to be able to use other words in their definitions to demonstrate their understanding.

(ii) A variety of answers was seen. Most candidates were able to explain that industries need to transport raw materials and also finished goods, however they often did not name the actual

locational factors such as near roads, railways, ports or airports. Few gave a full explanation referring to transport costs, bulk and perishability.

(c) Many different examples were seen and most of these were valid. However, deforestation was often given as an example of an economic activity rather than naming the economic activity that had caused the deforestation. Where candidates mentioned this later in their answer they were able to gain credit. Most did name an appropriate area although sometimes a country was given which limited responses to five marks. Most understood the concept of environmental risks and referred to ideas such as habitat loss, soil erosion and global warming. To gain full marks candidates needed to consider both local and global impacts. Weaker responses described the economic activity in detail rather than considering the environmental risks and many considered the impacts on people rather than the environmental risks.

GEOGRAPHY

Paper 2217/22
Investigation and Skills

Key messages

- Practical skills questions need to be completed precisely
- Given data should be interpreted to show understanding
- In ***Section B***, careful analysis should be backed up with evidence

General comments

This paper was comparable with previous sessions.

In ***Section A***, **Question 2** was the most straightforward, particularly **Question 2(c)(i)**. **Question 1(a)**, **Question 4(a)**, **Question 4(b)**, **Question 5(a)(ii)** and **Question 6(b)(ii)** were also done well. In contrast, **Question 1(b)(ii)**, **Question 1(d)(i)**, **Question 2(c)(ii)**, **Question 4(c)(ii)** and **Question 5(b)(ii)** seemed to be more challenging.

In ***Section B***, **Question 7** was more popular than **Question 8**, but those who attempted **Question 8** often scored well on it. **Question 8(a)(ii)**, **Question 8(b)(i)**, **Question 8(c)(i)**, **Question 8(d)(ii)** and **Question 8(e)(i)** all scored well, while in **Question 7** it was only **Question 7(a)** and **Question 7(b)(i)**. Candidates struggled with the sampling questions in **Question 7(d)**, while in **Question 8** it was comparison of the patterns in Figs. 8.4 and 8.5 which proved to be difficult.

Omission rates were high for **Question 1(d)**, **Question 2(b)**, **Question 4(b)** and towards the end of ***Section B*** on both questions, which perhaps suggests that candidates were running short of time.

Many candidates would benefit from further practice with map skills. They need to know how to use a ruler to get an accurate six figure grid reference, and how to measure a curving route and then use the scale line to translate the map measurement into the distance on the ground. A ruler was also helpful in **Question 2(b)** and candidates should make sure that they take one into the examination.

There is obviously a balance between spending too long on a question and giving attention to detail. Candidates needed to do a little more of the latter in ***Section A***, particularly **Question 1(a)**, **Question 2(c)(ii)** and **Question 3(a)**.

Comments on specific questions

Section A

Question 1

(a) The 1:50 000 map was of Katlenburg-Lindau, Germany. Fig. 1.1 showed a 4 km^2 area of the map and the position of features A, B and C, which candidates were asked to identify. A was a church, B was a sports ground and C was a line of trees. There were many correct answers for A, but B and C were sometimes swapped round, with candidates perhaps rushing at the start of the examination and not giving attention to detail. In C "main road with line of trees" was also accepted, since it was the road that was giving the line for the placement of the trees. In any other case, where candidates had written two answers on the same line, they scored zero.

(b) The River Rhume flowed from the south east to the north-west, until later turning north around Lindau. The direction of flow was shown in several places by small arrows as indicated in the key, and most candidates scored at least one mark for this, though up to two were available. The other

marks were for describing the physical features of the river such as its variable or increasing width, its confluence with the River Oder and many smaller tributaries and its meandering course with islands and ox-bow lakes. Comparatively few candidates scored marks beyond those already gained for direction of flow because they wrote about physical features in general rather than physical features of the river. There were many descriptions of vegetation with comments on relief and some just mentioned any map feature that could be seen near the river.

The six-figure grid reference of the confluence between the rivers Söse and Rhume was 764282. Candidates appeared to find this difficult. They needed to measure carefully for the third and sixth figures. 765283 was a common incorrect answer.

(c) Lindau was located on a higher spur of land, between the two valleys of the rivers Oder and Rhume, as they approached their confluence. With land between 140 – 150 metres, it was sited above the floodplain, but on land that was still relatively flat. Thus it had a defensive, dry point site, but with a water supply, building materials and fuel from the forest and plenty of farmland. Many answers pointed out the later additions of road access via the main road and the adjacent industrial sites providing jobs. Few wrote about the physical landscape, while some mentioned forest but without elaboration. Very few candidates reached six valid points, but most scored at least two or three.

(d) Answers between 5800 metres and 6 000 metres were valid for the distance along the 15L road between 811233 and the edge of the map. Candidates found this challenging and there was a high omission rate on this question. Relatively few gave answers within the range. Some were just outside, perhaps as a result of measuring the straight line distance, but many were confused when trying to convert a measurement to a distance, with the scale. Some candidates would perhaps be able to correct their errors if they stopped to consider whether their answer was realistic.

Candidates were then asked to describe the relief and land use along the route of the road and the question was worded so as to give them a direction of travel. They could then score marks for "starts on a gentle slope" and "goes uphill" as well as the usual relief comments such as steep, ridge and undulating. There were two spot heights given for points on the road, so a mark was available for quoting one of these. Although some responses focused more on relief, most scored the majority of their marks for land use – forest, farmland, industry and settlement. Weaker responses found the viewpoint, keyed under tourist information, and then wrote extensively about options for tourists in the area. To gain full marks, candidates had to mention both relief and land use.

Question 2

(a) Fig. 2.1 showed population growth for different regions of the world and candidates were asked how natural population growth was calculated. Most realised the need to calculate the difference between the birth rate and the death rate, but some added further parameters such as net migration.

In part **(ii)** the answer was migration or some aspect of it, such as emigration or immigration. Some used one of these, but many chose factors that would influence birth rate or death rate.

(b) Candidates then had to complete the line for Europe on Fig. 2.1. They were told that the decrease from 2040 to 2060 was expected to continue at the same rate, so needed to align their ruler with the 2040 to 2060 segment and then continue the line across the next two squares. There were some very neat answers, but others had not used a ruler and their lines tended to dip down or up at the end, changing the trend. A few had appeared to ignore the idea of the same rate and taken a guess. There was also a relatively high omission rate on this question.

(c) Africa and Australasia were both expected to show a continually increasing population and most responses gave Africa for a correct answer.

The population of Asia was expected to start to decrease between 2050 and 2058. Many candidates restricted their answers to the years that were labelled on the x axis, here giving 2060, which was inaccurate. The curve for Asia is clearly decreasing before this point.

Using the x axis labels did enable them to score in part **(iii)**, since the lines for Africa and North and South America crossed in 2 000 to 2 004.

Most candidates realised that Africa would be likely to have a larger population than Asia after 2100. To get the second mark they needed to say how they had reached this conclusion. Most pointed out that the graph indicated that Africa's population was rapidly increasing while that of Asia was beginning to decline. Some responses only mentioned Africa's increase, which was not enough for the mark, unless the fact that it was the fastest increase of all the regions was included. Other responses wrote about why population was increasing in Africa. Another correct approach was to simply state that the continuing trends would cause the lines to cross.

Question 3

(a) Fig. 3.1 was a photograph of part of an urban area in Africa and candidates were asked to describe the buildings. Most realised that they were residential and pointed out that they were close together with people accommodated on many storeys. Responses that went on to look at close details described the flat roofs, balconies, rectangular, glass windows and the grey concrete used for construction. Many noted the air conditioning units and satellite dishes attached to the building. There were some good answers here and most scored at least two or three marks.

(b) Candidates were then asked to suggest two advantages and two disadvantages of living in the buildings. For advantages responses tended to concentrate on the social aspect of being close to neighbours and the likely proximity to a place of work within the city. Few noted the benefits of air conditioning or the satellite links for television or internet. Some answers considered the advantages for the city such as "putting the buildings close together means there is more free land for farming".

The most common disadvantage was the idea of a noisy environment and some noted that the buildings would be vulnerable in earthquakes or that fires would spread easily. However, many made assumptions about crime rate of the area, overcrowding and spread of disease, which could not be deduced from the photograph. Further valid disadvantages included the lack of garden or outside space and climbing the stairs or reliance on the lift to reach the higher floors.

Question 4

(a) Fig. 4.1 was a wind rose, showing both wind direction and rainfall occurrence and candidates were asked which two instruments would have been used to collect the data. Most responded correctly, with wind vane and rain gauge, scoring two marks. Incorrect answers often included anemometer.

(b) Candidates were then asked to complete Fig. 4.1 to show wind from the north-west on six days, with rain on four of those days. Many responses correctly shaded six boxes on the north-west arm of the wind rose and inserted the letter R into any four of them to indicate rain. Common errors included putting the R labels in boxes that were not shaded and shading in the north east arm of the wind rose. Many candidates did answer correctly, but there was a high omission rate on this question.

(c) The prevailing wind direction was south, while the two wind directions that always caused rainy weather were south west and west. Most scored the mark in part **(i)** but had not read the question carefully in part **(ii)** and instead, selected the two directions with the most rain, ignoring the fact that the south direction included a day without rain.

For part **(iii)**, candidates needed to make use of Fig. 4.2, which showed the location of the town in relation to sea and mountains. They were asked to suggest why rain was associated with winds from the south west and west, and most pointed out that the sea was in this direction. Some answers gained a second mark for further details such as the air rising onto the land and up the mountains, resultant cooling condensation and relief rainfall.

Question 5

(a) Fig. 5.1 showed a plate boundary running through California and candidates were asked to describe the movements of the two plates shown. Arrows on Fig. 5.1 indicated that the two plates were both moving in the same direction, towards the north-west, and most candidates noticed this, though some gave the direction as north east. For the second mark, candidates needed to look at the speed of movement. They could simply state the data or use the difference to point out that the Pacific Plate was moving more rapidly. Many correctly recognised the conservative plate boundary.

(b) Candidates were then asked to describe the location of the major settlements shown on Fig. 5.1. Again there were some good answers, with many stating that the settlements were coastal and close to or on the plate boundary. A few mentioned that they were to the west of California, though some copied from the key and said that they were near the California state boundary, which was incorrect. Others used the word boundary without clear reference to either the plate or the state. Another approach was to describe the locations in relation to each other, with San Francisco about 650 km north-west of Los Angeles, but relatively few responses took this approach.

Candidates then had to suggest why many people choose to live in these settlements. Many responses focused on the coastal locations, with potential jobs in the tourist industry and the advantages of the connections available through ports. Some also commented on the moderate conditions of a coastal climate. Others pointed out that people might have family ties to the area or that they could not afford to go elsewhere. Weaker responses suggested the sea as a water source and fertile soils from volcanic eruptions. Relatively answers tied in to the plate boundary location, but candidates could have pointed out that many buildings have been built to withstand earthquakes and so people consider the benefits to outweigh the risks, putting their trust in warning systems and emergency procedures and hoping that it never happens.

Question 6

(a) Fig. 6.1 showed the risk of soil erosion in Europe and candidates were asked to describe the distribution of high risk areas. Most candidates scored a couple of marks here, usually for pointing out that the areas were in the south and were often mountainous. Others noted the central area and the area in the south east. For any of these locations, named countries or mountains were acceptable alternatives. Weaker answers tended to use the climate information on Fig. 6.1, which did not give a clear idea of distribution.

(b) A climate with a wet winter and a dry summer is likely to have the greatest soil erosion by water (part **(i)**), while one that is dry all year is likely to have the greatest wind erosion (part **(ii)**). Responses were usually correct for the latter but not always the former.

Soils in mountain areas are vulnerable to soil erosion due to steep slopes that may be lacking in vegetation, perhaps due to thin soils or harvesting of trees. The steep slopes would also promote rapid surface run-off and mountains may have high rainfall totals due to relief rainfall. Candidates rarely scored two marks, but some noted the steep slopes and lack of vegetation. Others seemed to be confused and argued that mountains prevented erosion.

(c) Farmland is most protected from soil erosion by maintaining continuous soil cover. Many candidates had selected the correct response.

Section B

Question 7

(a) Almost all candidates made a good start by explaining the meaning of the terms ‘Commercial farming’ and ‘Subsistence farming’. A small number gave the meaning in reverse and a very small minority made no attempt at the question. The most common answers involved ‘selling’ and ‘for the family.’

(b) (i) Again most candidates worked out the answer was 155 thousand tonnes. A few misread the vertical scale and gave 151. A small number gave figures for other crops than wheat.

(ii) The answer required a statement describing the change in tea production and maize production between 2011 and 2014 which most candidates did well, i.e. tea production had increased and maize production had decreased. However quite a few candidates decided to describe every trend for each year including giving statistics even though the question stated *‘Do not use statistics’*. Some candidates substituted wheat for maize in their description maybe following the use of wheat in **(b)(i)**. The key to success here, as in other questions, was to read the question carefully before answering.

(c) This question involved using map skills related to a distance scale and other locational clues such as where the village was in relation to the main road and the dry lowland area. The correct answer

of Athi Kamunyuni (Athi or Kamunyuni were also accepted) was worked out by over three quarters of the candidates. Quite a few responses stated Darajani as the answer but that is less than 10 km from the main road.

(d) (i) The best answers to this question referred to ideas such as testing the methodology, checking and amending the questions in the questionnaire and improving it, and doing the survey to save time when it came to the real fieldwork including how best to approach farmers who may not be keen to participate. Many thought the area being used was the actual fieldwork area so that it would be good to get used to it and while testing your equipment is a relevant answer in many pilot surveys, it was not credited here where the equipment consisted of a pencil and a questionnaire.

(ii) Candidates did not always make clear which random sampling system they were referring to for the advantages and disadvantages to be judged by examiners. Most said that one advantage was that there was no bias but that sampling could lead to information being unrepresentative; others chose random sampling numbers which would have a disadvantage of taking time to organise but would be less biased than just picking anybody where students may then exercise bias. In teaching this there is a need to distinguish the difference between the 'pick the next person you meet' random system and the 'random numbers' technique as each has different advantages and disadvantages. Overall candidates were better at stating an advantage than a disadvantage of random sampling.

(iii) Candidates should have studied random, systematic and stratified methods along with their advantages and disadvantages. Here one mark was given for stating Systematic or Stratified then two marks for describing that system in relation to choosing 'the farms.' Candidates needed to be aware that the question was specifically about applying the sampling method to the farms so, if they chose systematic - as most did – they could choose every fifth farmer or fifth farm they came across for example or they could put a grid over a map and choose a farm from every fifth square. What was not accepted, as quite a few suggested, was choosing a farm every five kilometres because, while this is a regular interval, it is an irrelevant technique as there just would not be a farm at such an even interval. Fewer candidates suggested Stratified sampling but then found it hard it describe it in the context of farming with references to equal male/females and a spread of age groups.

(e) (i) Quite a few candidates referred to primary data as first-hand information or original data that was being collected for the first time by 'you' or 'yourselves'. Some were a little vague giving definitions that might have been equally true of secondary data, e.g. data collected by the student or collecting directly from a source. A few added to their vague statements that primary data was not collected from the internet or from books which indicated they knew what it was but could not easily define it.

(ii) The question was about practical difficulties, not just difficulties, so candidates needed to think about the problems of carrying out the questionnaire in the countryside as opposed to urban areas where interviewees are ready to hand and the students can stand and wait. In this exercise the students would be interviewing the farmers, not dropping off questionnaires to be collected later, which is rarely successful in terms of returns plus the added burden of collecting them. Given this scenario, the difficulties could involve transport and access around the area to get to the farms, finding the farmers who may be busy away from the farm, finding cooperative farmers who would be willing to answer the questions and also give honest answers – candidates seemed to suspect that many farmers would lie or just not know the size of their farm for example. It was not accepted that farmers were illiterate or could not read or write as they were not filling in the questionnaire; language difficulties however could be possible and was accepted.

(f) (i) While the vast majority of candidates did this well. The technique may be unusual but there were three diagrams completed for the other three villages and a grid was provided to place the $3 \cdot 3$ squares to shade in the 9 hectares of land use. Most did draw the $3 \cdot 3$ square grids and shaded any 4 hectares for crops and 5 hectares for animals (giving 9 squares) to gain full credit. Quite a number ignored the grid provided and drew their own, e.g. drawing $5 \cdot 2 = 10$ squares but then shading in 9 of the squares correctly. In these cases they did not get the grid mark but did get the mark for correct shading.

(ii) Half of the candidates chose the correct answer in that the hypothesis was correct. Others claimed it was false because both north and south grew crops and animals so the land-use was similar. However they should have been looking for the degree to which the land-use was different to justify the hypothesis as there were clear differences between north and south. In the north a greater area

was used for crops than in the south and also a greater area was used for animals than in the south. They could have also stated that the use of the area in the north for crops and animals was quite even compared to the south where the area for crops was much greater than the area for animals. Statistics to back these statements up needed to total the areas used in the two villages in each area, not to compare two separate village statistics. A few identified the more straightforward answer that more cattle were in the north and more goats in the south. The key to success in this answer was to make clear which answers related to the north and the south. Some just compared the size of farms between the north and south with no discussion of the land-use.

(g) (i) One plot was needed at 80 per cent which involved no difficult judgements and the last two shadings in the key needed adding in correctly on a conventional pie chart that was plotted clockwise. While a high number of candidates did this well, there were still a large minority who did not attempt. Some of the 80 per cent plots were inaccurate; examiners expected an exact plot at 80 per cent here with no tolerance as it involved no judgement.

(ii) Quite a few candidates did not seem to know what the word 'environmental' meant whereby they made the incorrect decision that the hypothesis was correct when the environmental factors totalled 45 per cent and were outweighed by the non-environmental factors at 55 per cent. Candidates needed to look at the six listed farming difficulties and decide which were environmental and which other factors were non-environmental, e.g. economic/financial. The first three were environmental factors adding to 45 per cent; the second three were non-environmental adding to 55 per cent making the hypothesis false. The best candidates disagreed with the hypothesis, identified the larger other difficulties as economic or financial referred to the 55/45 per cent statistics and noted that the two main highest difficulties were poor transport links (22 per cent) and lack of cheap loans (20 per cent). A few made the correct hypothesis decision but then allocated 'pests and diseases' to the non-environmental group so their statistical evidence was flawed.

(h) Most candidates took the pragmatic view and suggested small-scale solutions to the problems of low rainfall such as creating boreholes or wells, creating an irrigation system and storing rainwater in tanks which were all credited. Many candidates however suggested large-scale schemes which the farmers themselves could not develop, e.g. dams, reservoirs, desalination, cloud seeding or lengthy pipelines to Nairobi or Mombasa. Some also suggested the farmers moved away to wetter areas which was a negative solution that was not credited. Only a few suggested transferring water from the wetter north area to the south; this was credited. A few suggested water-saving techniques such as taking showers rather than baths and using 'grey' water which were not credited in this question.

Question 8

(a) (i) Just over half of the candidates correctly placed *Erosion* in the top box and *Deposition* in the bottom box.

(ii) Although most candidates could name an 'oxbow lake' as the feature that may form if a meander was cut off by erosion, many gave other suggestions, e.g. waterfall, island, and cliff. Some just stated 'oxbow' which was credited.

(b) (i) This was answered well despite a few candidates treating the flowmeter as a float and letting its speed be measured 10 metres down the river with a stopwatch. There were plenty of opportunities to gain credit here even if one aspect of the answer was incorrect, e.g. it was acceptable to put the flowmeter or propeller in the water but not the pole; it was correct if the propeller 'turned' 'rotated' or 'spun' but not if it was 'moved.' Most gained credit for stating the propeller was put in the water and the speed was read on the velocity display.

(ii) The advantage of using a flowmeter was answered more correctly than the disadvantages in that most candidates recognised that it would be more accurate or faster than other methods yet it had disadvantages too. While many correctly stated that it could be affected by rocks or weeds which were credited, many thought that it was expensive or could malfunction, which were not credited. The latter was only accepted if it referred to the risk of batteries going flat. Some candidates focused on aspects of safety if using it in deep or fast flowing water which was not credited.

(c) (i) This shading exercise was completed correctly by most candidates; it just required a cross-hatch shading of the 0.51–0.60 box to get the mark. Man candidates did not attempt this question despite

this box being the only one not shaded on the page and the emboldened instruction **'Plot the result…**' there as a clear guide as to what to do.

(ii) Very few candidates looked for and identified any distinctive overall pattern comparing the meander with the straight section, e.g. meander velocity increasing towards the far bank whereas in the straight section the speed is highest in the centre then fell again. Most candidates just compared individual sites and their different velocities and compared the highest speeds at two sites; there was no reference to any overall pattern of any kind. These answers rarely received credit.

(iii) Partly because of difficulties with **Question 2(c)(ii)**, many candidates struggled to identify two different results although a few made perceptive observations about the current meander having higher velocities than the previous readings and a few did recognise that the current meander had a higher range of velocities than the previous one. Some just listed differences in velocities at specific individual distances which gave no overall view of the results or the main differences required.

(iv) As mentioned above, the difficulty with **Question 2(c)(i)** gave a few knock-on effects with the rest of part **(c)** but this sub-section was answered more correctly than **(ii)** or **(iii)** previously. Most realised that two different methods were being used or that it was possible for student errors in either method. Some referred to the weather or rainfall making a difference but did not specify to which meander this might apply.

(d) (i) Candidates found this a difficult question to answer**.** Candidates were expected to refer to how callipers or a pebbleometer would be used to measure pebble size here. They should have explained how a pebble would be clamped / placed between two jaws and then the length/long axis of the pebble could be measured using a ruler/tape or a scale. This unfortunately was not how most candidates read the question. Many described how they would sample pebbles from the river bed by using sampling techniques or even a quadrat and then added how they would measure the size or even weight by weighing them in a container. Very few gave any detail as to how the size or long axis/length of a pebble would be measured on the right instrument.

(ii) Some candidates thought that the two graphs were complete and made no attempt to plot the two points required. These were two straightforward plots for those that attempted them but a small number used the 0.2 and 0.4 horizontal labels to plot from instead of the velocity and average length statistics they were referred to in Table 2.1. Although most plotted the two points correctly, a few thought one small vertical square equalled one centimetre of length and plotted 8 and 17 too low as two squares on the vertical scale equalled one centimetre length.

(iii) Splitting the two decisions regarding the hypothesis for the meander and the straight section helped many candidates focus on a manageable answer rather than looking for one overall answer that applied to both. While many candidates gave the correct answers (Meander – true; straight section- false) they did not always back this up with data as clearly stated in the hypothesis and question. A significant minority did not attempt this question.

(e) (i) Almost all candidates could plot the two bars at 21 and 8 although a few misread the vertical scale and plotted their bars at 20.5 and 6.5 instead. Again a small percentage of candidates did not attempt this question.

(ii) Most candidates recognised, with detailed statistics, that the size of pebbles and numbers changed; that there were an increased number of pebbles downstream and a decreased number of larger pebbles. Those that just made general statements without any firm statistical evidence were not credited but many gave good answers such as the *'number of pebbles 16–20 mm decreased further downstream from 5 pebbles to 2 pebbles'*. Just to state that there were smaller pebbles downstream echoed the question with no evidence from the data provided.

(iii) It was important that candidates described any processes of erosion rather than just listed the usual ones of abrasion, attrition and solution. In answering such questions use of correct vocabulary does not gain credit; responses should show an understanding of what the terms means what these mean, e.g. some candidates stated attrition then described abrasion. Some candidates referred to the time that pebbles had been in the river, i.e. the longer time equated to more erosion and the heavier pebbles were deposited earlier so the light ones that travelled further downstream caused a subsequent smaller bedload in the lower course. One misconception that many candidates have is that the average velocity decreases in the lower reaches so pebbles

cannot be carried and are therefore deposited. While looking at the long profile of a river and the fact that the gradient gets less steep lower down would suggest that the river is moving more slowly, it is not true as the Bradshaw model mentioned at the start of **(e)** makes clear. The average velocity of a river actually increases in the lower reaches partly due to more water arriving from tributaries and the increased depth reducing friction at the river bed. This misunderstanding affected candidate choices in **(f)**. A significant number did not attempt this basic test of understanding of the erosional processes taking place in a river.

(f) The correct answer was rows 2 and 4, i.e. 'channel depth increases downstream' and 'discharge increases downstream.' The other distractors should have been considered but were incorrect. The most popular wrong pair of answers was row 1 and 3, i.e. 'average velocity decreases downstream' and 'channel width decreases downstream.' While it was easier to understand the former incorrect choice, it was strange that candidates thought the width of a river was less downstream.

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Investigation and Skills

There were too few candidates for a meaningful report to be produced.