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GEOGRAPHY

Paper 0460/12
Paper 1

Key messages

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

- follow the examination rubric correctly by answering 3 questions, one from each of the sections
- read through the entire paper and study the resources provided before selecting the three questions with care
- answer all parts of the three questions they choose in the spaces provided
- respond in the correct way to command words and words which indicate the focus and context of each part. Candidates tend to miss important 'key words' which result in lost marks, e.g. **1(a)(iii)** 'shape' **2(c)** 'housing' **6(a)(iv)** 'local'
- be familiar with the meanings of geographical words and phrases and confident in their use
- answer within the spaces provided in the question and answer booklet and be guided by the mark allocations in order to write answers of an appropriate length
- write clearly and legibly, avoiding vague words or statements which need to be qualified or elaborated
- ensure that ideas are developed and ideas linked when extended writing is required. This is particularly important in the case studies
- use various types of graphs and diagrams with confidence and be able to interpret them to support ideas
- interpret photographs and maps with precision, looking at them carefully and referring to the evidence in them. When the word 'only' is used in a question no credit will be awarded for information which is derived from another source, including knowledge
- understand that describing a distribution from a map and describing the location of a specific feature require different types of response
- have a wide range of case studies, at different scales, and choose them with care to fit the questions selected
- include appropriate place specific information in case studies, however this should not be part of long introductions or surplus background information which simply waste time and space and are not credited.

General comments

This was the third March examination testing this syllabus and the entry was increased in size. The most able and well prepared candidates showed some very good geographical knowledge and understanding and competence in handling the required skills, thus performing very well across the paper. Most candidates made an attempt at all parts of their chosen questions and the paper differentiated effectively between candidates of all ability levels.

There were relatively few rubric errors and the presentation of answers from candidates was generally acceptable, though a few proved difficult to read in parts.

Questions 1 and **3** were the most popular questions, with **Questions 5** and **6** being of roughly equal popularity. There were good answers seen to all questions, including those requiring extended writing, particularly the case studies on population control, the impacts of an earthquake, the reasons for deforestation and the impacts of an economic activity on the natural environment. The best of these answers were well focused, with developed or linked ideas and place specific information. Weaker responses were poorly focused or generic with disparate lists of brief points. Some contained long and unnecessary introductions, which were not relevant and did not gain credit.

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

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Comments on specific questions

Question 1

(a) (i) Most candidates estimated the percentage correctly..

(ii) Most candidates recognised the decrease in population and many gave inaccurate percentage figures. Some candidates only gave male or female statistics rather than the overall percentages.

(iii) Despite the emboldening of the word 'shape' in the question many candidates wrote about age groups, birth rate or death rate. Some others did not compare the two pyramids. Many of the candidates who interpreted the question correctly scored full marks, though some scored two marks by only writing about the base and apex of the pyramid.

(iv) This was well answered by most candidates with many scoring full credit with comprehensive answers giving many reasons for changes in both age groups.

(b) (i) Many candidates gained full credit for a correct calculation. The most common error made was not including the negative figure for net internal migration in the calculation.

(ii) Candidates who correctly understood the focus of the question scored well, with all the challenges given in the mark scheme being suggested. Some candidates referred vaguely to lack of resources, facilities and amenities which were not credited unless qualified or more precise. Despite the MEDC focus (Australia) a number of candidates focussed too much on challenges faced in an LEDC, such as the growth of squatter settlements, whilst others focussed incorrectly on challenges resulting from underpopulation rather than population growth.

(c) Most candidates used the 'one child policy' in China as their case study, although others used pro-natalist policies, such as those in Singapore or France. There were many excellent responses, with appropriate place details and references to various aspects of the policy in their chosen country. Some candidates restricted their answers to simply describing incentives or penalties rather than giving more wide-ranging descriptions, whilst others did not focus on the demand of the question and wrote about the need for the policy and/or the negative impacts of it.

Question 2

Very few candidates answered this question and high marks were not common.

(a) (i) Most candidates answered correctly.

(ii) Most candidates plotted and shaded correctly. A few mis-read the scale and plotted at 24.

(iii) Most candidates identified the increasing proportion of urban population over time though relatively few candidates gave accurate statistics for two years to back up their point with evidence.

(iv) Whilst a significant number of candidates misunderstood the question and focussed on natural population growth, most realised that they should concentrate on reasons for rural to urban migration and explained this by reference to appropriate pull factors.

(b) (i) Most candidates correctly identified appropriate countries.

(ii) Many candidates found the question difficult and some focussed incorrectly on reasons for movement to an urban area, repeating their answers to **(a)(iv)**, or they described the relative 'attractions' of living there. Candidates who realised what the question was about scored marks for reference to inability to buy houses and the lack of housing stock.

(c) There were very few high quality answers which focussed on specific areas of a city. Dharavi (Mumbai) was a popular case study, as was New York, although most answers tended to be vague, with simple statements at Level 1, and little by way of development, linked ideas or place detail. Some candidates did not focus sufficiently on 'housing conditions' as required but wrote about general improvements to urban areas, such as transport infrastructure and service provision.

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Question 3

(a) (i) Most candidates correctly selected 'strato-volcano '.

(ii) Few candidates recognised the crater and the secondary cone. Despite the positioning of the arrows on Fig. 3.1 many gave 'vent' for one or both answers.

(iii) Answers seemed roughly equally divided between those which correctly described specific hazards and those which wrongly described the effects of the hazards. Correct answers often referred to lava and ash, however there were some very impressive references to other hazards, such as lahars.

(iv) There were many good answers which included ideas from the mark scheme such as physical warnings of a possible eruption, prediction and planning strategies such as evacuation. Some weaker responses suggested that 'few people live around volcanoes' or gave the benefits of living near a volcano.

(b) (i) Many answers referred to features which could not be seen, such as the volcano being extinct/dormant or having lots of grass/vegetation growing on it, or features which were not relevant such as the road or cars. Many thought that the sides were gently sloping which clearly they are not. Candidates who scored marks usually did so by reference to the crater, though others mentioned the cone and/or ash or bare rock. Few responses referred to the top of the volcano having been removed.

(ii) This differentiated well. It is a familiar topic and candidates who knew what a constructive boundary was scored well, making several relevant points and including a labelled diagram. However many candidates incorrectly wrote about and drew a destructive boundary, for which they gained no credit.

(c) Haiti, Christchurch, Nepal and Kobe were the most popular case studies and there were some excellent detailed responses, some containing place specific and statistical information. Weaker answers simply listed points, such as damage to buildings, death and injury without any attempt to develop them (Level 1). A significant number of candidates wrote long and irrelevant introductions, many explaining the cause of their chosen earthquake, despite the question focus on 'impacts'.

Question 4

(a) (i) Most answers were correct.

(ii) Answers were generally disappointing, with few candidates scoring both marks. Many responses suggested that candidates were not familiar with 'range' and 'annual'.

(iii) Where candidates made use of the information provided in Fig. 4.2, they usually gained some credit by referring to latitude and, less frequently, insolation from the sun at a high angle. Weaker responses did not really understand the reasons affecting temperature and wrote about vegetation and why the area is dry.

(iv) As in **(iii)** the question discriminated well. Stronger responses showed a good understanding of why the area is dry with reference particularly to latitude, high pressure and descending air. Many candidates referred to the prevailing wind and cold ocean current which were shown on the map, but few showed any real understanding of how they influenced rainfall amounts.

(b) (i) The majority of candidates correctly identified Kisangani. Their justifications were generally correct, although weaker answers did not contain sufficient detail or comparison to gain credit, e.g. 'high temperatures' and 'high rainfall'.

(ii) This discriminated very well. The most common responses referred to emergents, rapid growth of vegetation and drip-tips or waxy leaves. Whilst good candidates showed how the characteristics were influenced by the climate, weaker responses did not make this link as the question required.

(c) A few excellent responses were seen with the Amazon rainforest being the most popular choice. Whilst many candidates focussed on the Amazon, there were also detailed answers about the rainforest in Borneo. Many candidates gave valid reasons for deforestation, though weaker ones

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tended to be brief lists and so scored only at level 1. Stronger responses developed the reasons and some included place details. Weaker answers tended to include irrelevant detail about the effects of deforestation on the local people and natural environment.

Question 5

(a) (i) Most candidates correctly completed HDI.

(ii) Many candidates stated that the HDI of Western European countries were higher and/or made this comparison using statistics. However, relatively few observed the other difference, that the range of values is greater in South America.

(iii) This was another good discriminating question. Candidates who knew how HDI was derived tended to score full marks, using the term composite indicator and identifying the different components used in the calculation. They also referred to the 0 – 1 scale which enables comparison of different countries or change over time.

(iv) Whilst there were a significant number of answers which gained full credit, many candidates stated valid indicators which are measurable but did not explain how they can be used to measure development, explaining instead why the indicators showed differences in development. Weaker answers gave vague ideas rather than ones which are specifically measurable, such as 'quality of life' or 'economic development'.

(b) (i) Generally the images were used well by candidates, most of whom correctly matched them to the types of economic activity.

(ii) This differentiated well with most, but not all, candidates making reference in some way to the level of economic development. The stronger responses further developed this idea by detailed reference to skills, mechanisation and resources for example. Weaker responses simply described how employment structure varies in countries at different levels of economic development, but did not explain why this is so. Some simply described the three sectors and gave examples, but did not explain their varying importance as required.

(c) Answers varied with examples at various scales from locations within India and Amazonia being the most common. Whilst there were some excellent answers, including developed descriptions and place detail, many lacked development, simply listing a variety of impacts, including those on people which were not relevant. Some answers, especially those about 'industry' in India and 'deforestation' in Amazonia were vague and did not specify the type of 'economic activity' which limited the marks which could be scored.

Question 6

(a) (i) Many candidates found it difficult to give a concise answer which did not include 'process' or 'processing'. The strongest answers focussed on 'changing' or 'refining' raw materials to produce a finished product. Ideally such answers should not contain the words 'assembly' or 'manufacturing' as the syllabus distinguishes between manufacturing, assembly and processing industries.

(ii) Many candidates scored two marks, usually one point referred to being near a water body. Some weaker responses references things which were not shown specifically in the image, such as pollution of various types.

(iii) Most candidates correctly placed the six labels. The most common error was to include sugar as a raw material and sugar cane as an output.

(iv) Candidates generally scored well with suggestions about air and water pollution, with the consequent impacts on wildlife and vegetation. Candidates should be reminded that the word 'pollution' without any qualification is not credited in any answer on this paper.

(b) (i) Many candidates identified the main area of states and better responses also referred to the northern exceptions. Some candidates did not support their ideas by identifying relevant states. Weaker answers merely listed all the states in the category with no reference to the distribution.

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(ii) This question allowed good discrimination. The best answers gave a variety of advantages and disadvantages as listed in the mark scheme whilst others referred to little more than jobs and money. Some candidates incorrectly focused on advantages and disadvantages for the TNC rather than the LEDC.

(c) Many candidates found difficulty in identifying a specific factory or industrial zone therefore many answers were general in their explanation of how location was influenced by different factors. Many candidates simply stated the location factors at level 1 but did not develop their explanations by explaining their influence by reference to the specific location of the factory or industrial zone chosen. Some industrial cities, especially in India, were named but there was little detail on specific areas or industries. One notable exception to this was the case study based on steel production at Pipri, Karachi, Pakistan, which produced a number of impressive answers with developed ideas and plenty of place detail.

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GEOGRAPHY

Paper 0460/22
Paper 2

Key messages

- When answering map work questions candidates should try keep responses relevant to the question and focus on the key words in the question. Further details are given later in this report in the comments on **Question 1(b)**, **(c)** and **(f)**.
- When answering photograph questions, candidates should concentrate on what can be seen in the photograph and avoid speculation for which there is little or no evidence.

General comments

The response to the paper was very variable. There were good answers to all the questions, but candidates found some aspects of each question more difficult.

Comments on specific questions

Question 1

(a) Candidates showed good skills of locating the features shown on Fig. 1.1 then identifying them using the key. Full credit was common. **A** was other major buildings (or industry), **B** was coniferous or mixed forest, **C** was marsh and **D** was low rise buildings.

(b) For the description of the physical and human features of the river, examiners allowed a wide variety of responses including: flows north east, at least 6 m wide, variable width, meanders, marsh, bridges, marina and gentle gradient. Most candidates scored some of these points but there was a tendency to write long, irrelevant answers describing land use around the river, which was not given credit.

(c) Most responses ignored the brief to describe the shape of the coastline and instead described land use near the river. Examiners gave credit for bays, headlands, islands and the straighter coastline in the south.

(d) This was well answered with most candidates quoting the tourist evidence of coastal location, leisure or second homes and bathing.

(e) Responses were generally accurate in giving measurements from the map. For the distance measurement examiners allowed answers within a tolerance of 3000 to 3200 m. The compass direction was south east, the bearing was within a tolerance of 127–131°, and the correct grid reference was 632031.

(f) As in **parts (b)** and **(c)**, there were many long, irrelevant answers. Responses tended to describe the land use of the firing range and often failed to comment on the relief which was required by the question. Credit was given for the flat or gently sloping relief, lowland, maximum height of 10 m, and the slightly higher or steeper land near the coast.

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Question 2

(a) An large number of candidates failed to plot 210 000 migrants in 2003 correctly.

In **part (ii)**, most candidates described the international migration accurately and in detail, with only a small minority describing the wrong graph. Most commonly, responses referred to the overall decrease from 330 thousand to 130 thousand with small increases in 2006 and 2011 and least in 2010.

Part (iii) was a more demanding question but many candidates noted that the mostly positive net migration was responsible for California's population increase.

(b) In **part (i)**, most candidates added the internal and international migration figures for Contra Costa to give a total immigration of 7768. Most noted that Santa Clara had the greatest internal emigration and Alameda had the greatest growth due to migration. Some candidates suggested that the latter was also Santa Clara, forgetting to deduct the negative internal migration for the positive international migration.

Question 3

(a) Candidates described the distribution of air pollution in Delhi very well. They referred to the high level in the centre, very high level in Dwarka, medium or low levels in the outer areas and higher levels along the roads.

(b) Describing the pattern of air pollution during the day proved more difficult. Those responses that referred to precise times from Fig. 3.2, e.g. medium levels between 01:00 and 10:00, gained the most credit.

(c) Candidates quoted a variety of evidence from Figs. 3.1 and 3.2 for and against vehicles being an important source of pollution. As evidence for this, they referred to the higher levels along roads and in the evening rush hour. As evidence against, they referred to the high level at night when fewer vehicles were on the roads and lower level during the morning rush hour. Some noted that the very high level at Dwarka was not completely along a road. A minority of responses ignored the instruction to use evidence from Figs. 3.1 and 3.2 in their answers.

Question 4

(a) Few candidates knew that water flow through the rock was groundwater flow but more knew that rain soaking into the ground was infiltration.

(b) To reduce flooding and erosion, the channel in Fig. 4.1 had been straightened, deepened and strengthened with stone walls. Few candidates scored more than one of these points. There was no evidence in the photograph that the banks had been raised.

When describing and explaining the differences in the river between the two Figs., candidates generally scored at least two of the four marks available. The best answers described the higher discharge, greater load and suspension load (examiners allowed 'brown' or 'muddy' water) in Fig. 4.2. As explanation, candidates suggested that rainfall, faster flow and a wider channel contributed in Fig. 4.2.

Question 5

(a) The majority of candidates were able to identify the maximum-minimum (or Six's) thermometer and the wet and dry bulb thermometer (or hygrometer).

(b) Most candidates correctly gave the present temperature as 25°C, the maximum temperature since in instrument was re-set as 30°C and the minimum temperature since in instrument was re-set as 10°C. However, it was common for incorrect figures for the last two temperatures of 35°C and 5°C to be given because candidates had read the temperature from the wrong end of the index.

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(c) Most candidates recognised that the air was unsaturated because the two thermometers did not show the same temperature. A few went on to give a fuller explanation, saying that evaporation of water would cool the wet bulb. Latent heat was not mentioned.

Question 6

(a) Although correct answers were common, many candidates failed to recognise that chemical fertiliser was an input and crops were an output.

(b) When describing the fields and land use in **part (i)**, full marks were common. Candidates often referred to arable farming, large, rectangular fields, roads, buildings, flat land, ploughed or bare areas and areas with trees. In **part (ii)**, most recognised the ponds or lakes or reservoirs as evidence for irrigation. The evidence given for commercial farming was usually the large fields, but many commented on the large buildings, possibly for storage, and large areas without housing.

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GEOGRAPHY

Paper 0460/42
Alternative to Coursework

Key messages

Here are a few messages to pass on to candidates for them to consider in their preparation. These have been suggested by examiners based on scripts they have marked:

- When answering hypotheses questions that ask whether you agree or not, give your opinion at the start of your answer before any supporting evidence. This will usually be *Yes, No* or *Partially/To some extent*. Do not just copy out the hypothesis if you agree with it. It is important to make a decision and state it as well as provide the evidence for your choice. Be clear in your decision – expressions such as '*might be true', 'could be false*' are too vague.
- When giving figures in an answer always give the units if they are not stated for you, e.g. data evidence in **Question 2(c)(iii)** should refer to metres and millimetres.
- When shading graphs, use the same style as that provided in the question and make sure your pencil gives a good dark image. Check you understand the scales used and the importance and style of any plots already provided, e.g. on **Question 1(b)(iii)** some candidates shaded the cross-hatching at the bottom of the divided bar graph in a different direction to the one shown and the key.
- When completing pie charts or divided bar graphs, complete these in the order of the data given and in the order of the key, e.g. **Question 1(b)(iii)** and **Question 1(c)(iii)**. Make sure your shading matches the key, e.g. if one shading is horizontal lines and another diagonal, make sure they do not look similar as happened sometimes on the pie graph in **Question 1(c)(iii)**.
- When you think you have finished, go back and check that all graphs have been completed; many candidates lose easy marks by missing out graphs, e.g. **Question 1(b)(iii)** on this paper.
- Read questions carefully and identify the command word, e.g. *Describe..., Explain…* A question that asks *'Why?*' requires a reason to be given not a description. If a question asks for data, e.g. **Question 2(c)(iii)** then you must use statistics from resources whereas evidence could be a qualitative answer.
- Check you are using the resources that a question refers you to, e.g. **Question 2(c)(iii)** Table 2.2 and Fig. 2.3. If exact figures are given in a table, these should be the ones referred to in evidence rather than estimating from a graph.
- Take into account the marks awarded. Examiners do not expect you to be writing outside the lines provided, so do not write a paragraph when only two lines are given – this wastes time.
- It is important that, when candidates write the remainder of their answer elsewhere, that they signal it by writing something like – *'continued on page 17'* to ensure it is seen. It needs also to be noted that some candidates gave the wrong sub-section number by their extra work which made it more difficult to match to their earlier answer and credit correctly.

General comments

The vast majority of candidates found this examination enabled them to demonstrate what they knew, understood and could do. Weaker responses scored well on the practical questions such as drawing graphs or diagrams and making choices from tables. Stronger responses scored well on the more challenging sections requiring judgment and decision-making on hypothesis choices with evidence and other written answers. **Question 1** on shops and services was much more accessible to candidates than **Question 2** on coastal processes. The paper was judged as fair and appropriate with no time issues for over 370 candidates entered for it.

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There is less general advice to be given for areas for improvement in this paper. As there are no question choices to make, it is difficult to miss sections out – though candidates do (especially completion of graphs) – and there were no reports of time issues as the booklet format does not allow or encourage over-writing of sub-sections.

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

Centres need to be aware that, although this is an *Alternative to Coursework* examination, candidates will still be expected to show that they know about fieldwork equipment, how it is used and fieldwork techniques. Some fieldwork experience is vital even if there is only limited opportunity within the Centre. Familiarity with maps, tables and the various graphs listed in the syllabus is also important for this examination.

Comments on specific questions

Question 1

(a) (i) For this question candidates had to use a scale for distance and compass direction to locate a feature – using a key – and the majority of candidates working out that the department store was located 90 metres north west of the shop selling bread and cakes. Incorrect answers included giving numbers from the key including number 8 which was the bread and cakes shop. The bank was also a frequent incorrect answer; this met the distance requirement but was not north west of the bread and cakes shop**.**

(ii) Most candidates could identify two services from Fig 1.1, the most popular being travel agent, banks, and hairdresser. A few gave goods instead of services such as cameras, gifts and souvenirs. A small number used their own knowledge to list goods or services that were not on Fig. 1.1 or even in the key.

(iii) Most candidates correctly suggested reasons linked to accessibility and transport including recognising the central location and the bus station. A second reason listed by many candidates was that there would be more customers there so more profit or revenue for the shops. Some also suggested reasons connected with linkage and the existence of other shops and services which could be used in the same visit. It was not accepted as a reason that a large population lived in the town centre.

(iv) This question was answered well by many candidates. They accepted that the hypothesis was true and then usually quoted the relative number of total shops and services, i.e. 206 in the centre and 77 on the edge; this was a reserve data mark. A second data mark could have been obtained by comparing the numbers of a chosen shop or service between the centre and edge. To justify variety, marks were also available for listing shops or services that existed in the centre but not on the edge such as museums, antiques, art gallery.

(b) (i) Almost all candidates identified the two correct statements (Rows 1 and 3) about convenience goods.

(ii) It was important to note that the question was about services not goods that were found on the edge of the town, not in the centre. This was well done although a few candidates either gave services instead of goods or chose examples from Fig 1.1. instead of Fig 1.2 which showed the edge of town. Acceptable answers included fast food, bread and cakes and the chemist. Incorrect answers included any goods, e.g. antiques, or service choices from the town centre, e.g. bus station.

(iii) The vertical divided bar graph, which required three correct plots plus the correct shading was completed well by most candidates. A few plotted 13 correctly but misplotted the 56 and 77 points; a small number cross-hatched the bottom part in the wrong direction.

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(c) (i) Many candidates suggested making changes or additions to the questionnaire which had already been decided and was shown for reference in the Insert. The candidates could have suggested three pieces of advice the teacher would give about using the questionnaire with people. These could have included being polite, choosing a sample method, working in pairs and asking people of different ages and gender. Many candidates focused on being polite, not forcing people to take part, and not asking people who looked busy which were all part of the same advice rather than separate ideas so only gained 1 mark not 3.

(ii) This was the most successful question on the paper; not quite all candidates correctly plotted the two bars though. A small number misread the scale – plotting at 52 per cent instead of 56 per cent – and others made no attempt at it but these were a very small minority.

(iii) The pie graph, while well done by most candidates, provided some challenges to others. Some plots were made in the wrong or reverse order and the two line shadings were sometimes too similar to credit.

(iv) This proved to be a more challenging hypothesis question than the earlier one in this question. Most candidates did recognise that the hypothesis was incorrect because, although the reasons were the same, their importance in terms of relative data were very different in the town centre compared to the edge of town. They needed to compare the main reasons with data, e.g. 51per cent chose the centre for a wide range of shops but 41 per cent chose the edge for good parking. Another difference would be mainly shopping in the centre for gifts/souvenirs but on the edge for clothes/jewellery. The best answers did this but others just listed the reasons with percentages in any order and did not compare these reasons as indicators of importance.

(d) Many candidates phrased their hypothesis as a question or as a statement to be investigated. The better responses realised that they had to suggest a hypothesis that was not similar to the two in the question, i.e. not involving buying goods or services and not involving reasons for shopping at either centre. The weaker responses suggested hypotheses that were almost the same as the two in the question or ones that were inappropriate, e.g. referring to the income or wealth of the shopper or how happy they were. The best hypotheses included where people came from, how far and how they had travelled, how often they visited and when they shopped. These usually had an appropriate question to go with the hypothesis.

Question 2

(a) Candidates found it difficult to give appropriate, specific precautions for the dangers listed. Ideas related to staying away from the cliff were accepted but the better answers were more precise suggesting avoiding the edge or base of the cliff. Wearing hard hats or helmets was not accepted; the students should not be in a location needing those. Similarly, while staying away from the water was accepted, more specific answers included not going in too deep to measure the waves. Appropriate clothes such as waterproofs and raincoats were accepted in order to protect themselves from rainfall but not postponing the fieldwork to another day or checking the weather forecast. Inappropriate answers also included tying themselves to rocks, working in groups and using a cell phone.

(b) (i) The better responses appeared to have had some experience of measuring profiles and could state the sequence of events in a logical and appropriate order. This included using marker poles vertically along a transect, placing the marker poles at changes of slope and using a clinometer to measure angles as well as measuring the distances between the poles. They also referred to the diagram in their answer. Weaker responses appeared to ignore the diagram and suggested poles were placed at equal distances up the slope and that the clinometer was used to measure distance.

(ii) Although most candidates agreed with the hypothesis simply by observing the two profiles, providing supportive evidence for the comparative steepness of the two beaches was not well done. Most candidates gave data for comparative height along the two beaches but ignored any reference to comparative distance which was essential to compare the gradients and judge steepness. While recognising that Bay Beach was higher, with data given for heights, it was not stated that Bay Beach was a shorter distance thereby being steeper than Long Beach. Only a small number of candidates referred to the gradient but those that did often worked it out to 3 significant figures. A few candidates chose sectors of the profile to exemplify how the gradient rose at Bay Beach but was flat at Long Beach which was credited.

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(c) (i) Stronger responses to this question suggested using a quadrat, though they often referred to it as a quadrant, and did suggest a sampling method – random or systematic – to choose the three pebbles at each site. They also suggested an appropriate tool to measure the size such as a pebbleometer, calliper or tape measure/ruler. Very few responses specifically referred to measuring the length of pebbles in millimetres which would have gained credit.

(ii) Almost all candidates plotted the point accurately. A few misread the scale, some put a cross instead of a point and others put the plot on the wrong vertical line. As with many straightforward graphs on this paper, a few did not attempt it.

(iii) This question was done well; most candidates chose the correct hypothesis and gained a second mark for stating that it only applied to Bay Beach. The question clearly stated 'support your decision with data' so statistics were required for 2 marks here. Quite a few gave the start and end statistics to demonstrate that Bay Beach pebbles became larger towards the back of the beach and that the size of Long Beach pebbles was more inconsistent, rising and falling too much to make the hypothesis work. Some candidates chose data from different parts of the beach profiles but this was not credited as points close to or at the start and end of the profile were needed to give an overall judgement related to the hypothesis.

(iv) Most candidates found this a difficult question. Almost all candidates chose to refer to processes of erosion and deposition at the low or high water mark when what was required was an understanding of the different impacts of swash and backwash on the distribution of beach material. Only a few candidates did this but their answers were vague regarding the related impacts. It was surprising that so few referred to larger material being at the back of the beach due to the presence of cliffs and rock falls.

(v) Again a challenging question for many candidates. The better answers suggested taking more samples than three pebbles at existing sites or reducing the intervals thereby creating more sites or getting another student to check the measurements at the time. Answers that were too vague included the generic 'repeat the experiment', 'do it another day/time' and 'do it in pairs or groups' without any suggestion as to how these would make the fieldwork more reliable.

(d) (i) Most candidates understood that the best way to measure wave frequency was to count the waves in a fixed period of time however this would get limited credit as it is important to fix a place – a pole, a boulder, a point on the beach – and count the waves that pass that place in a fixed period of time – usually a minute; not a second or an hour as some candidates suggested. A small number suggested using a float but had little idea how this would help measure wave frequency. A few irrelevant answers suggested measuring river velocity and measuring the speed of waves along a river. A significant minority of candidates did not attempt this question.

(ii) Many candidates gave good answers that showed that they had studied the characteristics of destructive and constructive waves and could make sound comparisons between them. There was good use of terms such as swash, backwash, amplitude and wavelength though some candidates did get the roles of swash and backwash the wrong way round describing destructive as constructive and vice versa. Some candidates included ideas about erosion and deposition which were not relevant as the question only wanted a description of how the waves were different, not what they did.

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