

**MARK SCHEME for the May/June 2012 question paper
for the guidance of teachers**

9768 GEOGRAPHY

9768/04

Paper 4 (Research Topic), maximum raw mark 50

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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1 Study Figs 1 and 2 which show temperature data for the city region of San Juan, Puerto Rico.

Fig. 1 shows average temperatures throughout the day for selected land-uses in San Juan. Fig. 2 shows the average daily temperature range for these land-uses.

(a) Use Fig. 1 to state the time of day when, for the CBD, the following were recorded:

(i) maximum average temperature;

(ii) minimum average temperature

[2]

- Max = 12.30
- Min = 05.30
- Allow a tolerance of plus or minus 15 minutes

(b) Using Fig. 1, compare the average temperatures throughout the day for mowed grassland areas with those of forested areas. [4]

- MG has higher peak, lower min
- Both peak and min are earlier for MG
- MG steeper rise, gentler fall
- Forest warmer at night

4 @ 1mk or 2 @ 2mk or combination for comparisons

(c) To what extent does there appear to be a link between the maximum average temperatures shown on Fig. 1 and the average daily temperature ranges shown on Fig. 2 for the different land-uses? [6]

The overall impression is of a weak inverse relationship or accept no relationship – expect candidates to draw this out with some valid support from the 2 figures
e.g. CBD has highest max, but 2nd smallest range; MG 2nd highest peak but highest range; forest lowest peak and lowest max

L3 (5–6 marks)

Clear and detailed assessment of the relationship or lack of
Extensive and accurate data support

L2 (3–4 marks)

Some assessment of the relationship (or lack of)
Provides data support at the top end of this level

L1 (0–2 marks)

Little attempt to address the question; simple description
Data support inaccurate or lacking

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- (d) Assess the value of Figs 1 and 2 to those studying the intensity of the heat island effect in urban areas. [8]**

Urban heat islands develop best under particular meteorological conditions and during certain seasons and at particular times of day. The intensity of the heat island also depends on the interplay between these physical factors along with a number of human controlled factors including building density, building materials and land use.

Expect answers suggesting that Fig. 1 has some value [as it shows the difference between urban land uses (CBD & MG) and non-urban (AF and Forest) but gives little by way of explanation] while Fig. 2 is of limited value since it hints at urban/rural differences but not in a very convincing fashion.

L3 (6–8 marks)

Clear and detailed evaluation of the usefulness and limitations of the resources. The resources are well used to support the points made. A clear understanding of other information which would be of use.

L2 (3–5 marks)

Some analysis of the usefulness and limitations of the resources, which may be unbalanced. Provides support for some observations. At the top end there may be a limited awareness of other information which might be useful.

L1 (0–2 marks)

Little understanding of the usefulness of the resources; perhaps simple description. Support is inaccurate or lacking.

- 2 (a) Study Fig. 3, which shows the probability of fog on selected routes serving the city of Breda, the Netherlands.**

Outline the spatial pattern of the probability of fog for the selected routes shown in Fig. 3. [5]

There seems to be a higher probability away from the urban area – e.g. to the S and to the W (along E312; a lower probability immediately to the E & NNE? (E311). Some anomalies to the overall pattern e.g. on both N/S roads

L3 (4–5 marks)

Clear and detailed description of the pattern shown. Anomalies are clearly identified. Data from the map is well used to support the points made.

L2 (2–3 marks)

A valid attempt to describe the pattern. Data is used to support the points made. Less importance placed on the anomalies.

L1 (0–1 marks)

Limited ability to interpret the map and identify a pattern, may simply describe. Use of data is inaccurate or lacking.

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- (b) 'Knowledge of microclimates has a greater impact on decision making at the local scale than knowledge of climate.'

From your wider study of microclimates, to what extent do you agree with this statement? [10]

An opportunity here to explore the topic of microclimates and their role in decision making at the local scale. Transport, agriculture and building design would all furnish plenty of material to address this question. Good responses will focus on the "to what extent" with some useful exemplar support.

L3 (8–10 marks)

Evaluation is to the fore with appropriate exemplar support. There is a sophisticated understanding of the role of microclimate. The answer is well founded on evidence.

L2 (5–7 marks)

Able to describe and offer some explanation. Sound knowledge and understanding, lacking depth in places. Conclusion limited. May well refer to decisions only without addressing the evaluative part of the question.

L1 (0–4 marks)

The approach is largely descriptive and piecemeal with little or no attempt to address the question. Superficial statements. Little exemplar support.

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EITHER

- 3 With reference to your own investigation of microclimate, to what extent were you able to minimise potential errors in your data collection?**

Begin by stating the question or hypothesis that you investigated. [15]

Answers should be based firmly on their own investigation, quoting examples drawn from this.

Clearly, much depends on the investigation. A range of responses is acceptable, but be wary of those which state that all errors were successfully eliminated.

L4 (13–15 marks)

The candidate displays a high order understanding of the potential errors and the extent to which the strategies adopted to minimise them were successful. Evaluation is to the fore and well supported by examples drawn from the investigation.

L3 (10–12 marks)

Good understanding of the potential errors and strategies to minimise them. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question.

L2 (7–9 marks)

More focused on the candidate's own investigation. Attempts to address the question, but in only a superficial fashion. Only limited support from the candidate's own investigation.

L1 (0–6 marks)

Discussion lacks detail. Perhaps descriptive only, with little attempt to address the question. Little reference to candidate's own investigation.

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OR

- 4 With reference to your own investigation of microclimate, discuss the extent to which you were able to explain all your findings.**

Begin by stating the question or hypothesis that you investigated. [15]

Answers should be based firmly on their own investigations, quoting examples drawn from this.

Clearly, much depends on the investigation and the choice of data. Candidates should be aware of the limitations of their investigation (e.g. spatial, temporal, scale) and the interplay between a range of factors, some of which may be unknown.

In terms of evaluation a range of responses is acceptable from 'to a large extent' to 'to a small extent' depending upon the investigation.

L4 (13–15 marks)

The candidate displays a high order understanding of the extent to which all the findings could be explained. There is good support drawn from the investigation. Evaluation to the fore.

L3 (10–12 marks)

Good understanding of the extent to which all the findings could be explained. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question.

L2 (7–9 marks)

More focused on the candidate's own investigation. Describes the findings, but in only a superficial fashion. May focus on just those findings which can be explained.

L1 (0–6 marks)

Discussion lacks detail. Perhaps descriptive only, with only piecemeal comments about the findings. Little reference to candidate's own investigation.

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5 Study Fig. 4 which shows reported catches of polar bears in Baffin Bay and East Greenland between 1996 and 2003

(a) Giving evidence from Fig. 4 state the year in which there was the smallest difference between the reported polar bear catch in Baffin Bay and the catch in Greenland. [2]

- 1996
- Allow 52 – 60

(b) Using Fig. 4, compare and contrast the trend in the reported catch of polar bears in Baffin Bay with that of East Greenland between 1996 and 2003. [4]

Baffin Bay – gradual but undulating rise, from 67 to 116/117 in 2002, almost doubling in 2003 from 2002 (to 212)

E Greenland – gentler rise to peak of 87 in 2000, then drop (slight rise 02–03)

4 @ 1mk for each clear comparison or contrast. (reserve 1 for a comparison, 1 for a contrast)

Fig. 5 shows, for the Arctic, the distribution of polar bears and pollution by toxic contaminants called PCBs. It has been suggested that polar bears may be particularly vulnerable to this type of pollutant.

(c) Discuss whether Fig. 5 confirms a link between polar bear populations and contamination by PCBs. [6]

Highest PCB (30.1 – 40) – Barents Sea confirms link; other population and trends largely unknown

Lowest PCBs (< 20) – Population totals variable; trends mostly decreasing, regardless of population total

Mid Range PCBs (20.1 – 30) – Middle populations; trends stable or unknown.

Be flexible given the nature of the evidence.

On the basis of this the map does not seem to support the suggestion. Credit well those who give an opinion and are able to support it with evidence from the resource.

L3 (5–6 marks)

Clear and detailed account, well focused on the question with extensive and accurate data support

L2 (3–4 marks)

Clear description of the link (or more likely, lack of link) shown.

Provides data support and, at the top end of this level, some awareness of the anomalies.

L1 (0–2 marks)

Descriptive with little attempt to address the question.

Data support inaccurate or lacking

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(d) Assess the strengths and weaknesses of Figs 4 and 5 for those responsible for conserving natural environments. [8]

The issue of conservation involves sustainability and the delicate balancing act between human activity and the deterioration of natural environments. An answer which focuses on this theme and assesses the strengths and weaknesses of each resource in relation to this should be well rewarded.

The scope is general, so any natural environments(s) will be acceptable.

Candidates are likely to respond that the figures are useful to some extent or only to a limited extent.

A good answer, while discussing the pros and cons of the resources provided, will acknowledge that there are a wide ranging array of variables and perhaps point out other sources of information which would inform the issue.

L3 (6–8 marks)

Clear and detailed analysis of the usefulness and limitations of the resources.

The resources are well used to support the points made. A clear understanding of other resources which would be of use.

L2 (3–5 marks)

Some analysis of the usefulness and limitations of the resources, which may be unbalanced. Provides support for some observations.

There may be a limited awareness of other resources which might be useful.

L1 (0–2 marks)

Little understanding of the usefulness of the resources; perhaps simple description.

Support is inaccurate or lacking.

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- 6 (a) **Study Fig. 6, which shows the populations of trout and pH values for lakes in Southern Norway in 1972.**

'The higher the trout population, the greater the pH value of the lake'

How far does Fig. 6 support this statement? [5]

Valid approaches would be to agree with or (less likely) to challenge the statement. Look for the quality of the argument and supporting evidence taken from the resource.

Good and over populated lakes – generally have a pH above 5; greater than 70% of them above 5.51

60% of the empty lakes have a pH of 5 or less; of those lakes with a sparse trout population, 18(19)% have a pH of 5 or less

L3 (4–5 marks)

Clear and detailed analysis of the degree to which the resource supports (or otherwise) the assertion in the question. Data is well used to support the points made.

L2 (2–3 marks)

A valid attempt to address the question. Data is used to support the points made.

L1 (0–1 marks)

Limited ability to interpret the resource, may simply describe. Use of data is inaccurate or lacking. No attempt to address the question.

- (b) **From your wider study of conservation, consider the extent to which initiatives designed to conserve natural environments have been successful. [10]**

Much will depend upon the examples chosen, and candidates may legitimately consider that the initiatives have been a success, a partial success or not at all successful. The important feature is that they must use a range of examples to support their point of view.

L3 (8–10 marks)

Evaluation is to the fore with sophisticated exemplar support. There is a clear and well supported attempt to 'consider the extent'

L2 (5–7 marks)

Describes initiatives but the evaluation, though present, is less well thought out or weakly justified. Exemplar support limited.

L1 (0–4 marks)

There is some reference to initiatives but the approach is largely descriptive and piecemeal. No attempt to evaluate or very superficial.

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EITHER

- 7 With reference to your own investigation of conservation, to what extent were you able to minimise potential errors in your data collection?**

Begin by stating the question or hypothesis that you investigated. [15]

Answers should be based firmly on their own investigation, quoting examples drawn from this.

Clearly, much depends on the investigation. A range of responses is acceptable, but be wary of those which state that all errors were successfully eliminated.

L4 (13–15 marks)

The candidate displays a high order understanding of the potential errors and the extent to which the strategies adopted to minimise them were successful. Evaluation is to the fore and well supported by examples drawn from the investigation.

L3 (10–12 marks)

Good understanding of the potential errors and strategies to minimise them. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question.

L2 (7–9 marks)

More focused on the candidate's own investigation. Attempts to address the question, but in only a superficial fashion. Only limited support from the candidate's own investigation.

L1 (0–6 marks)

Discussion lacks detail. Perhaps descriptive only, with little attempt to address the question. Little reference to candidate's own investigation.

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OR

- 8 With reference to your own investigation of conservation, discuss the extent to which you were able to explain all your findings.**

Begin by stating the question or hypothesis that you investigated. [15]

Answers should be based firmly on their own investigations, quoting examples drawn from this.

Clearly, much depends on the investigation and the choice of data. Candidates should be aware of the limitations of their investigation (e.g. spatial, temporal, scale) and the interplay between a range of factors, some of which may be unknown.

In terms of evaluation a range of responses is acceptable from 'to a large extent' to 'to a small extent' depending upon the investigation.

L4 (13–15 marks)

The candidate displays a high order understanding of the extent to which all the findings could be explained. There is good support drawn from the investigation. Evaluation to the fore.

L3 (10–12 marks)

Good understanding of the extent to which all the findings could be explained. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question.

L2 (7–9 marks)

More focused on the candidate's own investigation. Describes the findings, but in only a superficial fashion. May focus on just those findings which can be explained.

L1 (0–6 marks)

Discussion lacks detail. Perhaps descriptive only, with only piecemeal comments about the findings. Little reference to candidate's own investigation.

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9 Study Fig. 7 which shows the index of multiple deprivation for selected villages and for selected areas in the urban fringe in England in 2007.

(a) Using Fig. 7, state the difference between the number of census areas in the 10% most deprived areas and the 10% least deprived areas in villages. [2]

- 10% least deprived areas – allow 235 to 245
- 10% most deprived areas – allow 25 to 35

Difference to match above

(b) Describe the differences between the distribution of deprivation in villages and the distribution of deprivation in the urban fringe shown in Fig. 7. [4]

Some examples:

- Both increase up to 70%, although at different rates
- Numbers in urban fringe all increase; numbers in villages decrease from 71% onwards
- up to 70% numbers increase much faster in villages than urban fringe

Credit any valid difference. If no supporting data from resource maximum 2 marks
No marks for similarities

(c) Fig. 8A shows employment deprivation and Fig. 8B health deprivation for Eastern and Southern England in 2007. Fig. 8C names the regions shown.

Using Figs 8A and 8B, suggest how similar are the spatial patterns of employment and health deprivation.

Expect comments in general agreement. Quality may be indicated by support from the resource, the nature of the judgement and the identification of differences. Areas of contrast could include, among others, Greater London as well as the central and eastern parts of E Anglia.

L3 (5–6 marks)

Clear and detailed assessment, well focused on the question
Extensive and accurate data support

L2 (3–4 marks)

Clear description of the similarities and differences. Provides data support
An attempt at evaluation

L1 (0–2 marks)

Descriptive - Limited awareness of the similarity or no reference to the question
Data support inaccurate or lacking

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(d) Assess the value of Figs 7, 8A and 8B for displaying patterns of deprivation [8]

Deprivation has many dimensions (e.g. economic, social, environmental) and the resources given are limited in scope

Fig. 7 shows IMD and gives a good visual impression which facilitates comparison . However, it lacks locational information. Also, how are urban fringe and villages defined?

Figs 8A and 8B deal with employment and health. The maps are good for a regional view, but the scale needs to be larger to show deprivation on a more local scale.

Good responses will deal with the pros and cons of each resource, have a sound grasp of deprivation and probably acknowledge other resources which could be useful (e.g. other dimensions (domains) of deprivation)

L3 (6–8 marks)

Clear and detailed analysis of the usefulness and limitations of the resources. A sound grasp of deprivation. The resources are well used to support the points made. A clear understanding of other resources which would be of use.

L2 (3–5 marks)

Some analysis of the usefulness and limitations of the resources, which may be unbalanced.

Provides support for some observations.

At the top end there may be a limited awareness of other resources which might be useful.

L1 (0–2 marks)

Little understanding of the usefulness of the resources; perhaps simple description.

Support is inaccurate or lacking.

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10 Fig. 9 shows information about poverty and cholera in the province of Kwazulu-Natal, South Africa, in January 2001

(a) To what extent is there a relationship between cholera and poverty shown in Fig. 9? [5]

To an extent, but there are areas of Very High and High poverty (e.g. N coast) where no cholera is reported. Also, some areas of Low/Medium poverty (e.g. Durban) have cholera.

L3 (4–5 marks)

Clear and detailed analysis of the degree to which there is (or is not) a link shown on the map. The anomalies are clearly identified. Data is well used to support the points made.

L2 (2–3 marks)

A valid attempt to address whether the link or otherwise. Data is used to support the points made. Less importance placed on the anomalies.

L1 (0–1 marks)

Limited ability to interpret the map, may simply describe. Use of data is inaccurate or lacking. No attempt to address the link.

(b) From your wider study of deprivation, consider the extent to which initiatives designed to reduce deprivation have been successful. [10]

Much depends on the examples chosen, and a range of responses would be valid e.g. to a large extent, to some extent or to a limited extent.

A good response will address the evaluative nature of the question and be well supported with exemplar material

L3 (8–10 marks)

Evaluation is to the fore with sophisticated exemplar support. There is clear consideration of the extent to which the initiatives discussed have been successful.

L2 (5–7 marks)

Addresses the evaluative element of the question, but the evaluation is expressed without any depth of argument or only a superficial level of support.

L1 (0–4 marks)

The approach is largely descriptive and piecemeal.

No attempt to address the question.

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EITHER

- 11 With reference to your own investigation of deprivation, to what extent were you able to minimise potential errors in your data collection?**

Begin by stating the question or hypothesis that you investigated. [15]

Answers should be based firmly on their own investigation, quoting examples drawn from this.

Clearly, much depends on the investigation. A range of responses is acceptable, but be wary of those which state that all errors were successfully eliminated.

L4 (13–15 marks)

The candidate displays a high order understanding of the potential errors and the extent to which the strategies adopted to minimise them were successful. Evaluation is to the fore and well supported by examples drawn from the investigation.

L3 (10–12 marks)

Good understanding of the potential errors and strategies to minimise them. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question.

L2 (7–9 marks)

More focused on the candidate's own investigation. Attempts to address the question, but in only a superficial fashion. Only limited support from the candidate's own investigation.

L1 (0–6 marks)

Discussion lacks detail. Perhaps descriptive only, with little attempt to address the question. Little reference to candidate's own investigation.

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OR

12 With reference to your own investigation of deprivation, discuss the extent to which you were able to explain all your findings.

Begin by stating the question or hypothesis that you investigated. [15]

Answers should be based firmly on their own investigations, quoting examples drawn from this.

Clearly, much depends on the investigation and the choice of data. Candidates should be aware of the limitations of their investigation (e.g. spatial, temporal, scale) and the interplay between a range of factors, some of which may be unknown.

In terms of evaluation a range of responses is acceptable from 'to a large extent' to 'to a small extent' depending upon the investigation.

L4 (13–15 marks)

The candidate displays a high order understanding of the extent to which all the findings could be explained. There is good support drawn from the investigation. Evaluation to the fore.

L3 (10–12 marks)

Good understanding of the extent to which all the findings could be explained. The answer makes appropriate reference to the candidate's own investigation. Well focused on the question.

L2 (7–9 marks)

More focused on the candidate's own investigation. Describes the findings, but in only a superficial fashion. May focus on just those findings which can be explained.

L1 (0–6 marks)

Discussion lacks detail. Perhaps descriptive only, with only piecemeal comments about the findings. Little reference to candidate's own investigation.