

Specimen Paper Answers – Paper 2

Cambridge International AS Level Environmental Management 8291

For examination from 2022



© Cambridge University Press & Assessment 2022 v1

Cambridge Assessment International Education is part of Cambridge University Press & Assessment.
Cambridge University Press & Assessment is a department of the University of Cambridge.

Cambridge University Press & Assessment retains the copyright on all its publications. Registered centres are permitted to copy material from this booklet for their own internal use. However, we cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within a centre.

Contents

Contents	3
Introduction	4
Details of assessment.....	5
Question 1	6
Question 2	12
Question 3	18
Question 4	22
Question 5	29

Introduction

The main aim of this booklet is to exemplify standards for those teaching Cambridge International AS Level Environmental management 8291 for examination from 2022. In this booklet, we have provided examples of very good answers for Specimen Paper 2.

Each response is accompanied by a brief commentary on performance, explaining the strengths and weaknesses of the answers. Comments are given to indicate where and why marks were awarded, and how additional marks could be obtained. In this way, it is possible to understand what candidates have done to gain their marks and how they could improve.

The mark scheme for the Specimen Paper is available to download from the [School Support Hub](#)

2022 Specimen Paper 2

2022 Specimen Mark Scheme 2

Past exam resources and other teaching and learning resources are available on the [School Support Hub](#)

Details of assessment

The syllabus for Cambridge International AS Level Environmental Management 8291 is available at [School Support Hub](#)

Paper 2 Management in Context

Written paper, 1 hour 45 minutes, 80 marks

Paper 2 has between four and six structured questions, with a range of task types.

Externally assessed

50% of the AS Level

Question 1

Question 1(a)

- 1 Electronic waste (e-waste) includes items such as discarded personal computers and electronic components within televisions and computer monitors.

The number of e-waste landfill sites is increasing around the world. Around 50 million tonnes of e-waste were generated worldwide in 2018.

- (a) Suggest why the number of e-waste landfill sites is increasing around the world.

Specimen answer

The population is increasing and more and more people have computers. They don't last long so they get thrown away.

Mark awarded = 1 out of 1

Examiner comment

The candidate has been awarded the mark for stating that the population is increasing.

This question assesses AO3 as it involves reaching a conclusion based on qualitative information.

Common mistakes

The second sentence starts with 'They'. This should be avoided because it's not always clear what 'they' refers to. Candidates should also avoid using 'it' as this is also not always clear what 'it' refers to.

Question 1(b)

- (b) People are concerned about leaching of toxic substances from e-waste into soil.

Suggest one reason why people are concerned about leaching of toxic substances into soil.

Specimen answer

If toxic substances are in the soil, they can leach into the ground water. This means that humans could end up drinking it.

Mark awarded = 1 out of 1

Examiner comment

The candidate has been awarded the mark for stating that the toxic chemical could contaminate ground water. This is a 'suggest' question which implies that there are numerous correct answers and that the candidate will have to deduce an answer using information in the question and other knowledge. Other suitable answers include reducing biodiversity, bioaccumulation and biomagnification.

This question assesses AO3 as it involves reaching a conclusion based on qualitative information.

Common mistakes

Candidates commonly state that toxic chemicals cause pollution. This is correct but it is not specific enough to be awarded a mark. In this question, the toxic chemical could contaminate ground water.

Question 1(c)(i)

(c) A soil scientist wants to find out if soil near an e-waste landfill site is contaminated with lead.

The scientist collects 500 g of soil from five sampling sites.

Fig. 1.1 shows the location of the five sampling sites.

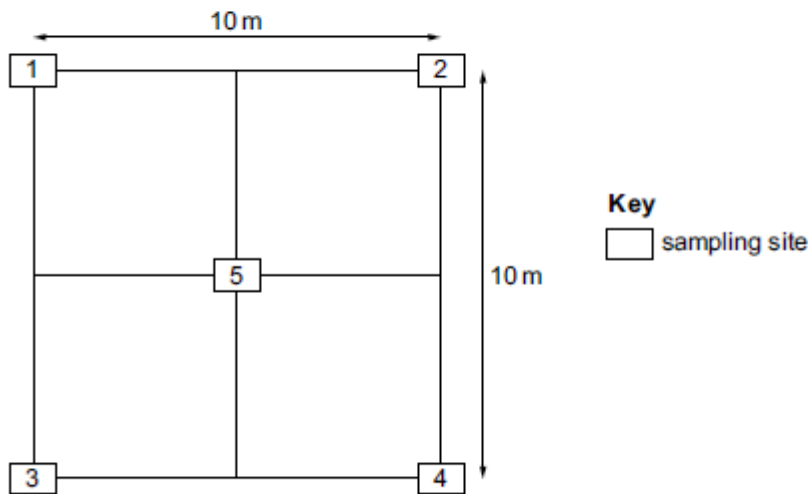


Fig. 1.1

The scientist considers two methods, A and B, for obtaining soil samples for analysis.

method A

- 1 Remove any stones, animals or plant material from each 500 g soil sample.
- 2 Put 100 g of soil from each of the five soil samples into a large plastic bucket and mix the soil thoroughly.
- 3 Remove 100 g of mixed soil from the bucket and put in a clean plastic bag.
- 4 Test this sample of soil for lead.

method B

- 1 Remove any stones, animals or plant material from each 500 g soil sample.
- 2 Put 100 g of soil from the sample collected at site 1 into a clean plastic bag.
- 3 Test this sample of soil for lead.
- 4 Repeat steps 2 and 3 for the other sampling sites.

(i) Suggest one advantage of using method A compared with method B.

Specimen answer

Method A is better because it tests five samples.

Mark awarded = 0 out of 1

Examiner comment

The candidate has missed the fact that both methods use five sample sites. The advantage of method A is that it allows results to be processed faster because only one test is required. Also, the result for method A gives an average value without processing any results.

This question assesses AO3 as it involves making a judgement based on qualitative and quantitative information.

Common mistakes

Making judgements is a difficult skill. Candidates should take time to read the information carefully and identify any differences. These differences will be the key to making a judgement. In this question, the main difference is that the samples are mixed together in method **A** whereas in method **B** they are tested separately.

Question 1(c)(ii)

(ii) Suggest one limitation of using method **A** compared with method **B**.

Specimen answer

Mixing the samples together means that only an average value is known so samples with large concentrations will not be identified.

Mark awarded = 1 out of 1

Examiner comment

The candidate has been awarded the mark, and in fact, has made two statements that could be credited. This question assesses AO3 as it involves making a judgement based on qualitative and quantitative information.

Common mistakes

The subject of the question is method **A**. If candidates answer in terms of method **B**, it must be clear which method is being described. For instance, stating 'it allows individual samples to be analysed to look for variation in the site' is a correct statement about method **B**, but not method **A**. A stronger response would state 'method **B** allows individual samples to be analysed to look for variation in the site'.

Question 1(c)(iii)

(iii) Suggest one reason why plant material is removed from the 500 g soil samples.

Specimen answer

The plants may affect the results.

Mark awarded = 0 out of 1

Examiner comment

The candidate has given a simple explanation, but it cannot be awarded a mark because it is not specific enough. A stronger response would state that 'plants may absorb the toxic chemical'.

This question assesses AO3 as it involves making a judgement based on qualitative and quantitative information.

Common mistakes

Candidates often give vague answers that cannot be credited. Questions involving experimental methods will have information in the question that can be used to write a detailed answer that is more likely to be credited. Candidates should avoid simply stating that something is 'affected' as this does not tell the examiner what the affect is.

Question 1(d)

(d) Some information on lead concentrations in soil is shown in Table 1.1.

Table 1.1

concentration of lead / ppm*	recommendations
< 400	<ul style="list-style-type: none"> • wash hands immediately after gardening • wash all produce thoroughly
400 to 999	<ul style="list-style-type: none"> • reduce exposure to the soil • wash hands immediately after gardening • restrict access of children to the soil • do not grow leafy vegetables directly in the soil
1000 to 2000	<ul style="list-style-type: none"> • reduce exposure to the soil • wash hands immediately after gardening • do not grow food crops in the soil • do not allow children access to the soil • keep soil covered
> 2000	<ul style="list-style-type: none"> • avoid contact with the soil • contact your local health department or environmental protection officer

*ppm = parts per million

A concentration of 400 ppm is the safe soil lead concentration threshold.

The scientist used method A and found the soil sample had a lead concentration of 1358 ppm.

Write a conclusion about the lead concentrations in this sample of soil.

In your conclusion include one recommendation from the table.

Specimen answer

The soil contains a higher concentration of lead than the safe threshold. The person should not grow food crops in the soil.

Mark awarded = 2 out of 2

Examiner comment

The candidate has written a good conclusion and has been careful to use correct terminology from the question. For instance, they have correctly used 'concentration' and 'safe threshold' to ensure the conclusion is directly based on the information in the question.

This question assesses AO2 and AO3. Reaching a conclusion based on qualitative and quantitative information is an AO3 skill and using information from the question is an AO2 skill.

Common mistakes

Candidates often list several recommendations despite the question specifying that only one should be given. Only the first can be credited and additional answers must not contradict the first. If a question asks for 'one recommendation' or 'one reason', only one should be given.

Question 1(e)

- (e) Some high-income economy countries (HICs) export their e-waste to low-income economy countries (LICs).

In 2018, this waste disposal strategy was permitted provided the electronic item can be repaired or reused.

Evaluate the advantages and disadvantages for HICs and LICs of this waste disposal strategy.

Specimen answer

The HIC is using its wealth to pass on the problem (✓) to the LIC which has to accept the waste as it needs the income (✓). The HIC is taking advantage of the LIC. The LIC cannot always repair the waste as they don't have the expertise or technology (✓) so it ends up dumped in landfill. Overall, I think that it should not be allowed because the problem is global (✓) and this simply moves things around and requires energy to do so (✓).

Mark awarded = 5 out of 6

Examiner comment

The ticks indicate where marks were awarded. The candidate has written a good response and has been awarded five marks. They have made it very clear if their statements refer to LICs or HICs and they have made an overall judgement using evidence. However, insufficient advantages and disadvantages have been described for full marks to be awarded.

This question assesses AO1, AO2 and AO3. The impact of waste disposal is AO1 knowledge. Making a judgement based on qualitative and quantitative information is an AO3 skill and using information from the question is an AO2 skill.

Common mistakes

Candidates often start to write before they think about the structure of their answer. Questions requiring an evaluation should be carefully structured. For instance, advantages and disadvantages should be described, followed by an overall judgement.

Question 1(f)

- (f) Describe two strategies for reducing the impacts of e-waste.

Specimen answer

1 recycle e-waste

2 reuse e-waste

Mark awarded = 1 out of 2

Examiner comment

The candidate has given responses that are too similar for them both to be credited. 'Reduce, reuse and recycle' is considered to be one strategy for dealing with waste. Other strategies include educating people about e-waste and legislating against e-waste disposal.

This question assesses AO1 knowledge.

Common mistakes

The question asks specifically about reducing the impacts of e-waste. Therefore, answers must be appropriate for e-waste and not general waste.

Total mark awarded = 11 out of 15

Question 2

Question 2(a)

- 2 The graph in Fig. 2.1 shows the increase in sea level due to ice loss from the Antarctic ice sheet between 1993 and 2017.

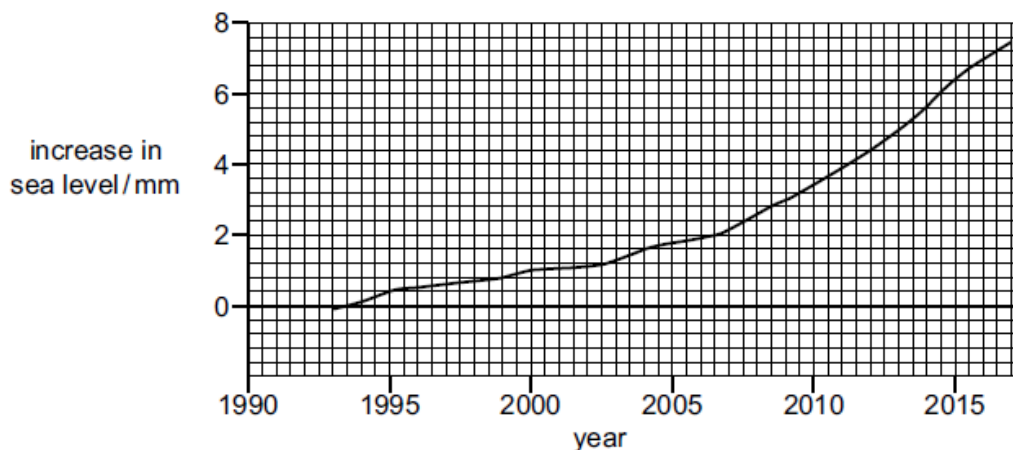


Fig. 2.1

- (a) Describe the trend in sea level between 1993 and 2017, shown in Fig. 2.1.

Specimen answer

Between 1993 and 2007 the increase in sea level was at a steady rate. After 2007 the increase was more rapid. The biggest increase in sea level was 2017.

Mark awarded = 2 out of 3

Examiner comment

The candidate has been awarded two marks for describing two trends shown by the graph. The data quote is correct, but it cannot be awarded a mark as it is simply restating data from the graph.

This question assesses AO2 because it requires a trend to be described.

Common mistakes

Data quotes should involve some form of mathematical manipulation, otherwise they are simply restating provided data. In this question, a good data quote would compare 1995 and 2015 by stating that the increase in sea level is 16 times greater in 2015 than in 1995. This is calculated by reading the increase in sea level in 1995 (0.4 mm) and 2015 (6.4 mm) from the graph and then dividing 6.4 by 0.4.

Question 2(b)

- (b) Suggest an explanation for the trend shown by the data.

Specimen answer

The increasing population has added more and more greenhouse gases to the atmosphere so the average global temperature has increased. This is one aspect of climate change and it

causes the ice sheets to break up and eventually melt. This additional water causes the sea level to rise.

Mark awarded = 2 out of 2

Examiner comment

The candidate has written a strong response and is awarded full marks. The correct terminology is used to describe the increase in global temperatures and then the candidate goes on to explain how this causes sea levels to rise.

This question assesses AO2 because it requires an explanation of a trend.

Common mistakes

Candidates frequently realise that the cause of the increase in sea level is global warming, but they omit to go on and explain how increased temperatures cause the sea level to rise. Strong responses describe that at higher temperatures, the rate of ice loss is greater than the rate of ice gain so there is a net gain of water in the ocean. Increased temperatures also cause the thermal expansion of sea water which also causes the sea level to rise.

Question 2(c)(i)

- (c) The Antarctic Treaty was originally signed by 12 nations in 1959. The treaty has now been signed by 53 nations.

The Antarctic Treaty refers to Antarctica as:

'... a natural reserve, devoted to peace and science'.

Agreements within the treaty relate to:

- protection of the Antarctic environment
- designation and management of protected areas
- management of tourism
- freedom of scientific investigation
- scientific cooperation.

Figs. 2.2, 2.3 and 2.4 show human activities within the area covered by the Antarctic Treaty.

Fig. 2.2 shows tourists visiting a king penguin colony.



Fig. 2.2

Fig. 2.3 shows scientists carrying out research in the Antarctic. Researchers use vehicles powered by a fossil fuel to cover the large distances in the Antarctic.



Fig. 2.3

Fig. 2.4 shows a meteorologist using a weather balloon. A monitoring device is attached to the balloon, which is released into the atmosphere. The device sends meteorological information back to a computer.

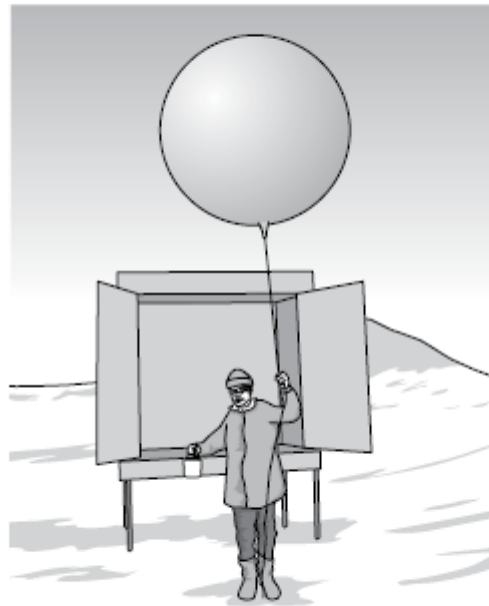


Fig. 2.4

- (i) Evaluate the success of the Antarctic Treaty in managing the impact of human activity in Antarctica. Refer to evidence from Figs. 2.2, 2.3 and 2.4 in your answer.

Specimen answer

In Fig 2.2 the tourists are far too close to the penguins (✓). This disrupts their normal behaviour and may affect them breeding. However, if this was regulated (✓), trained guides could limit the impact and the tourists could be charged so the revenue can pay for education and management.

Fig 2.3 shows scientists working. This research is vital for our understanding of climate change, and the data allows people around the world (✓) to see the effects of climate change. However, the scientists do have an impact. They bring provisions but leave waste and human waste (✓). The vehicles add to atmospheric pollution (✓) and their noise may also disturb sensitive animals.

Mark awarded = 5 out of 6

Examiner comment

The ticks indicate where marks were awarded. The candidate has produced a good response and is awarded five marks. However, they have not referred to Fig. 2.4 as requested by the question. Fig. 2.4 shows a weather balloon. These balloons gather information that can be used by scientists around the world, but they are often lost and add pollution to the environment.

This question assesses AO2 and AO3. Making a judgement based on qualitative and quantitative information is an AO3 skill and using information from the question is an AO2 skill.

Common mistakes

The question states that evidence from all three images should be used. The mark scheme takes this instruction into account and candidates are unlikely to be awarded full marks if they do not refer to all three images.

Question 2(c)(ii)

(ii) There are deposits of coal in Antarctica.

Mining is prohibited by the Antarctic Treaty.

Suggest two other reasons why these coal deposits are not mined.

Specimen answer

1 Ice covers the land in Antarctica so extracting the coal is very difficult.

2 Transporting any extracted coal would be difficult due to the distances being large.

Mark awarded = 2 out of 2

Examiner comment

The candidate has stated two correct reasons why coal deposits are not mined in Antarctica.

This question assesses AO1 knowledge, but also AO2 as candidates can use their knowledge of mining and apply it to the context of Antarctica.

Common mistakes

Candidates often give answers that are too vague to be credited even though they are close to being correct. For instance, stating that 'transport is difficult' is insufficient for a mark to be awarded. A stronger response would state that 'transport is too difficult because of the distance to market or the extreme weather of the Southern Ocean'.

Total mark awarded = 11 out of 13

Question 3

Question 3(a)(i)

3 Fig. 3.1 shows some branches of an apple tree.



Fig. 3.1

- (a) A student used a beating tray to estimate the number of insects on the leaves of an apple tree.
- (i) Describe how the student could use the beating tray method to estimate the total number of insects in the tree.

Specimen answer

Number the branches on the tree and use a random number generator to select (✓) a branch. Put a collection tray under the branch (✓) and shake (✓) the branch so the insects fall onto the tray. Count the number of insects in the tray (✓). Repeat using 5 more branches so an average (✓) per branch can be calculated. Then multiply the average by the total number of branches (✓) on the tree.

Mark awarded = 6 out of 6

Examiner comment

The ticks indicate where marks were awarded. The candidate has written a detailed method describing how to perform the collection and also how to process the results.

When describing sampling techniques, it is important to structure the response carefully. Candidates should consider and describe:

- How will the sample be identified? (random or systematic)
- How is the technique performed? (brief details of the method)
- How will reliable data be collected? (repeat several times and calculate a mean value)
- How will the results be processed? (calculate an estimate using the mean value)

This question assesses AO1 and AO3. Planning an investigation is an AO3 skill and describing a collection technique is AO1 knowledge.

Common mistakes

Candidates often describe experimental methods in great detail but omit how to process the collected data. The question asks how the total number of insects can be estimated, so to be awarded full marks a response must describe how the data is to be processed. In this question, the number of insects on a named number of branches should be counted then a mean value calculated. This mean number of insects per branch can then be multiplied by the number of branches on the tree to give an estimate of the total number of insects on the tree.

Question 3(a)(ii)

- (ii) Describe one benefit of using a beating tray as a sampling technique.

Specimen answer

The technique is cheap because it only requires a tray.

Mark awarded = 0 out of 1

Examiner comment

The candidate has made a true statement, but it does not answer the exact question being asked. The question asks for the benefit of using a beating tray as a sampling technique. Strong responses describe the fact that they allow a whole branch to be sampled quickly or that they avoid having to look for camouflaged insects that may be hidden on the leaves.

This question assesses AO1 knowledge.

Common mistakes

Care should be taken when describing cost as a benefit or limitation. To ensure marks are awarded, cost should always be qualified with a description of why it makes it a benefit or a limitation.

Question 3(b)(i)

- (b) The codling moth (*C. pomonella*) is a major pest of apple trees in parts of the USA.

The codling moth larvae eat holes in the apple fruit, which makes the apples unsellable.

A researcher decides to use crowd sourcing to investigate the extent of the codling moth problem in the USA.

The researcher posts a questionnaire online and asks members of the public to record sightings of the adult codling moth or its larvae and any damage to the apple tree or fruit.

- (i) Write a suitable questionnaire the researcher could use to obtain the information. The questionnaire should contain four questions.

Specimen answer

Question 1 What is the address?

Question 2 What date did you see the moth or larvae?

Question 3 Did you see adult moths or larvae?

Question 4 What damage was visible?

Mark awarded = 3 out of 4

Examiner comment

The candidate has provided three suitable questions. The questions are clear, unambiguous and require simple answers that are easy to quantify, therefore, they are good questions for a questionnaire. Question 1 is not suitable because it is ambiguous and may not gather the correct data. The question could mean the address of the apple tree or it could mean the address of the person submitting the survey. A better question would ask for the location of the apple tree.

This question assesses AO1 and AO2. Understanding questionnaires is AO1 but applying that understanding to the context given in the question is AO2.

Common mistakes

When writing questionnaires, candidates often write complicated questions that could generate many different responses. The answers from this type of question are difficult to process and are therefore unsuitable as a method of collecting data. Questions should be clear and unambiguous, like questions 2 and 3 of the candidate's response.

Question 3(b)(ii)

(ii) Suggest two limitations of this method of data collection.

Specimen answer

1 Codling moths may be difficult to identify and easily confused with other moths.

2 People tend to overestimate the moths so the data may not be very good.

Mark awarded = 2 out of 2

Examiner comment

Response 1 is a good description of a limitation of this method and is awarded a mark. Response 2 is attempting to explain that the general public may not gather data in a scientific manner and therefore the data may be unreliable. The mark was awarded but it would have been better if the data was described as 'unreliable' rather than 'not very good'.

The responses are limitations of this method when sampling codling moths, but general limitations of the method would also be acceptable as the question does not specify which type is required.

This question assesses AO1 knowledge.

Common mistakes

Candidates often describe limitations in general terms and omit to use scientific terminology. The aim of every questionnaire and investigation is to gather reliable data that is unbiased. Using these terms ensures the response describes the limitation scientifically.

Question 3(c)(i)

(c) The codling moth is considered an invasive species in China.

(i) State what is meant by invasive species.

Specimen answer

An invasive species is one that is introduced into a habitat and is non-native.

Mark awarded = 1 out of 2

Examiner comment

The candidate has been awarded one mark for stating that invasive species are introduced species. The response also states that they are non-native, which is true, but it is the same as saying they are introduced. Full marks would have been awarded for describing that invasive species become established quickly and out-compete native species. This question assesses AO1 knowledge.

Common mistakes

Candidates often give responses that are too similar to be awarded separate marks. If a question is worth two marks, two distinct points must be made if full marks are to be awarded.

Question 3(c)(ii)

(ii) State one impact of invasive species.

Specimen answer

Invasive species out-compete native species causing them to decrease in population.

Mark awarded = 1 out of 1

Examiner comment

The candidate has written an excellent description of the impact of invasive species. The response includes several key terms, 'out-compete', 'native', 'decrease in population', and this ensures the impact is described scientifically. This question assesses AO1 knowledge.

Common mistakes

Candidates often state that invasive species cause other species to die out. This type of generic answer may be true, but a stronger response would state that invasive species cause native species to decrease in population, or that they change the species diversity of a habitat.

Total mark awarded = 13 out of 16

Question 4

Question 4(a)(i)

- 4 (a) Predictions about climate change are based on computer model projections. Table 4.1 shows data for the percentage difference in warming rates between model projections and observed values between 1975 and 2013.

Table 4.1

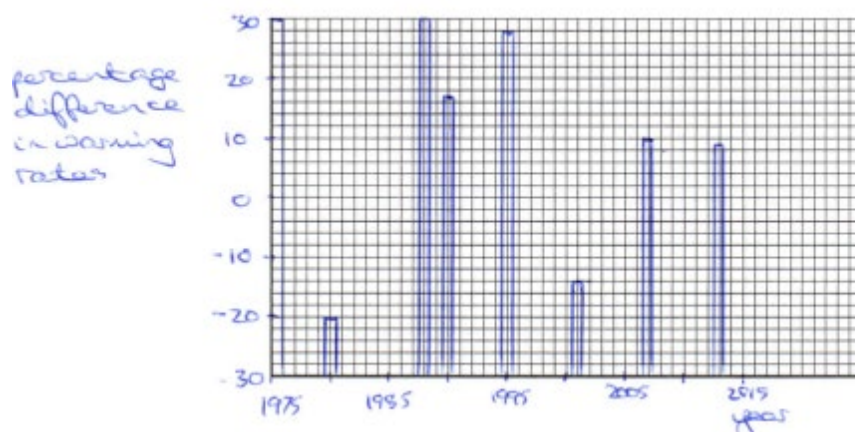
date of model	percentage difference in warming rates between model projections and observed values
1975	+30
1981	-20
1988	+30
1990	+17
1995	-28
2001	-14
2007	+8
2013	+9

Key

- + model overestimated warming rate
 - model underestimated warming rate

- (i) Plot these data as a bar chart on the grid.

Specimen answer



Mark awarded = 2 out of 3

Examiner comment

The candidate has labelled both axes and used linear scales that clearly show the positive and negative values on the y-axis. However, the bars have not started at zero on the y-axis and two bars are also plotted at incorrect values. The bar for 1995 should be plotted at -28, not 28, and the bar for 2007 should be at 8, not 10. Therefore, the plotting mark cannot be awarded.

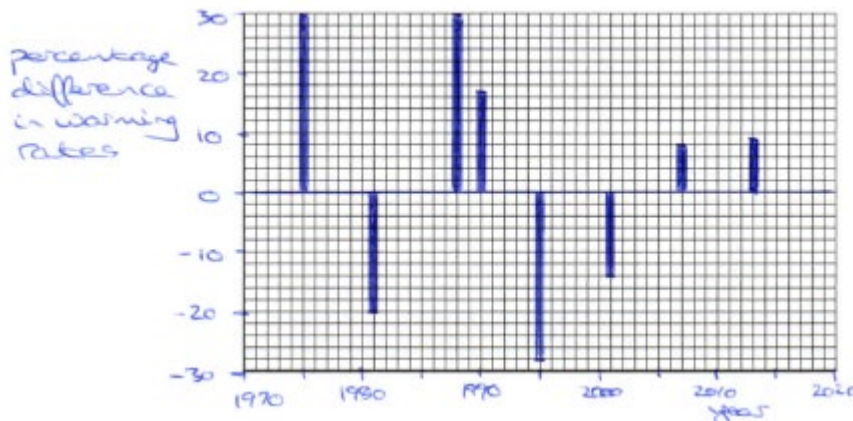
Graph drawing is an AO2 skill.

Common mistakes

It is advisable to plot graphs using a sharp pencil so that any mistakes can be clearly erased. In a bar chart a ruler should be used for completing the bars and the bars must be of equal width. Although not applicable to this question, candidates often forget to include units in the labels on the axes.

Candidates find it challenging plotting data that contains positive and negative values. When plotting this type of data, the zero on the y-axis will not be at the bottom of the graph grid. It is acceptable to label the axis and add the scale at the bottom of the grid.

When plotting years on the x-axis, it's important that the years are given on a linear scale and that the axis is also labelled 'year'.



Question 4(a)(ii)

(ii) Calculate the range for these data.

Specimen answer

58

Mark awarded = 1 out of 1

Examiner comment

The candidate has identified the maximum (30) and minimum (-28) value and correctly calculated the range to be 58.

Manipulating numerical data is an AO2 skill.

Common mistakes

Candidates frequently state the maximum and minimum value rather than calculating the range. In this question, 30 to -28, gives a calculated range of 58.

Question 4(a)(iii)

- (iii) Comment on the reliability of these computer model projections in predicting the rate of warming between 1975 and 2013.

Specimen answer

The model projections are unreliable as sometimes they overestimate and sometimes they underestimate the warming rate.

Mark awarded = 1 out of 2

Examiner comment

The candidate has used the information in the key to explain that the model projections give data that is unreliable as the model both overestimates and underestimates. Close analysis of the data shows that since 2001, the percentage differences are getting smaller and hence the reliability is improving.

This question assesses AO2 as it involves drawing inferences.

Common mistakes

Candidates often describe the data rather than commenting on the data. The command word 'comment' requires candidates to give an informed opinion. In this question, that means explaining how the reliability has changed between 1975 and 2013. Simply stating data does not answer the question unless it is comparative and illustrates how the reliability has changed.

Question 4(a)(iv)

- (iv) Outline the difficulties in using climate change models.

Specimen answer

Climate change models are unreliable, so it is difficult to draw a conclusion from them. Also, people may interpret the models differently (✓) depending on how they analyse the data. Models are only as good as the data they make their projections from. Old data is only over 100 years (✓) so may not reflect what will happen long term.

Mark awarded = 2 out of 4

Examiner comment

The ticks indicate where marks were awarded. In this question, the candidate has explained that there are uncertainties in conclusions and there is limited historical data so is awarded two marks. Additional marks could have been awarded for explaining that climate feedback mechanisms are not fully understood and that there is a delay between cause and effect that makes predictions unreliable.

This question assesses AO1 knowledge.

Question 4(b)

- (b) Describe strategies for managing climate change through the reduction of greenhouse gas emissions.

Specimen answer

To reduce greenhouse gas emissions, we must reduce our use of fossil fuels (✓). To do this we can use more renewable sources such as wind and solar (✓). We can also reduce our carbon footprint (✓) by using less energy e.g. change lights to LEDs.

Mark awarded = 3 out of 4

Examiner comment

The ticks indicate where credit was awarded. The candidate has made the link between greenhouse gas emissions and fossil fuels and gone on to explain two ways of reducing emissions. An additional mark could have been gained for explaining that governments can also follow international agreements to limit emissions.

This question assesses AO1 knowledge.

Common mistakes

Candidates often list ways an individual can reduce emissions by limiting their use of energy. For instance, using low energy appliances, turning heating down and switching appliances off. However, these are all one strategy and would only be awarded one mark.

Question 4(c)(i)

- (c) Solar radiation management is a geo-engineering strategy aimed at counteracting climate change.

- (i) Outline how solar radiation management could be used to counteract climate change.

Specimen answer

One way of counteracting climate change is through albedo enhancement (✓). This is where white or shiny surfaces are used to reflect energy back into space. The surfaces could be the roofs of houses (✓) or even reflectors in space (✓).

Mark awarded = 3 out of 3

Examiner comment

The ticks indicate where marks were awarded. The candidate has been awarded full marks but has omitted to describe all SRM strategies. Describing stratospheric aerosols would have ensured full marks. Also, the response has not described the general principles of SRM strategies. SRM strategies aim to prevent solar radiation from reaching the Earth's surface or reflect more energy back into space.

This question assesses AO1 knowledge.

Common mistakes

Candidates often describe examples of albedo management but neglect to state the name. In this question, simply naming albedo management would be awarded a mark.

Question 4(c)(ii)

- (ii) Suggest why some people are concerned about using solar radiation management to counteract climate change.

Specimen answer

We have no idea how managing the climate will change global weather.

Mark awarded = 1 out of 1

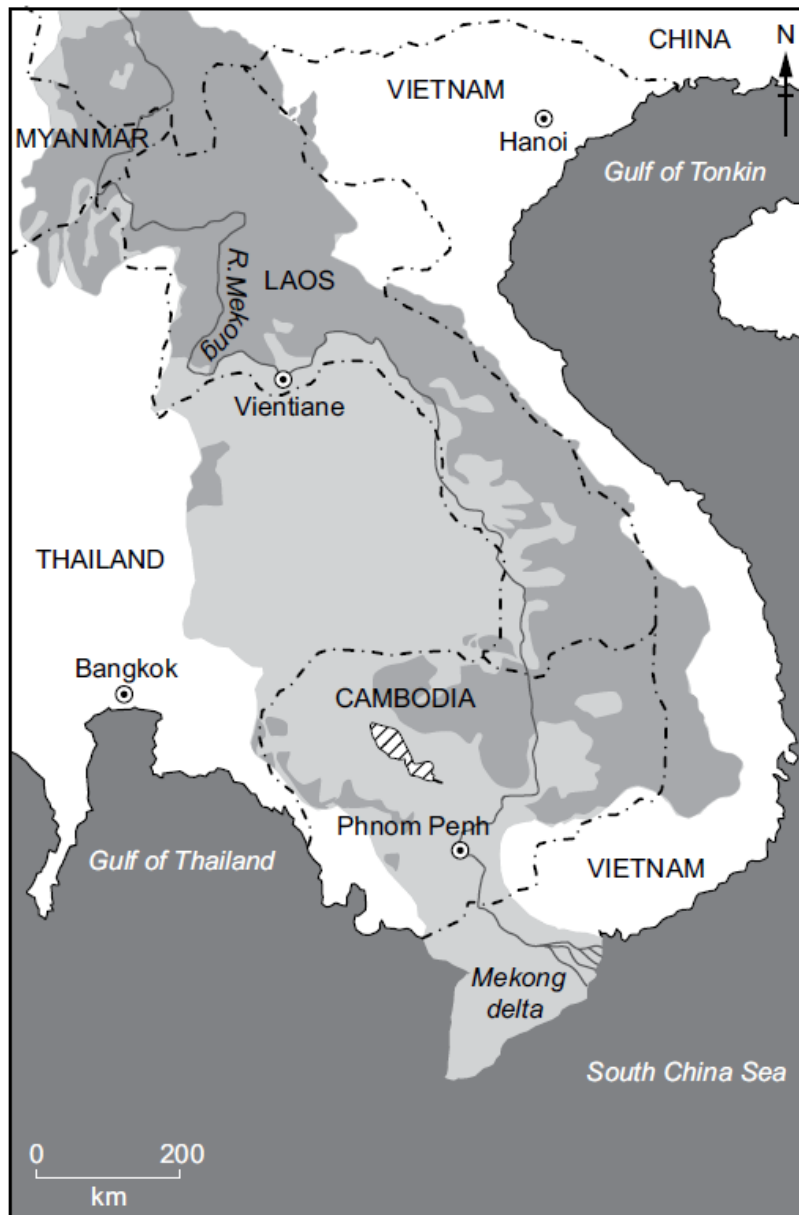
Examiner comment

There are many ways of expressing why people are concerned about solar radiation management and the candidate has suitably described one concern.

This question assesses AO1 knowledge.

Question 4(d)

(d) Fig. 4.1 contains information about the Mekong river basin, which extends over a large area of land in southeast Asia.



1 Snow and glacier melt is the main source of fresh water in the upper course of the river.

2 The river flow is influenced by the monsoon rains (May to October).

3 The Mekong delta:

- is an area of low land where the Mekong river splits into smaller rivers
- has an increase in salinity (concentration of salt in water) when river flow is low during the dry season (November to April)
- is a major rice-growing region of the world
- has a population of approximately 17 million.

Key

Land use in Mekong river basin

agriculture

forested area

land outside Mekong river basin

Mekong river basin boundary

capital city

international boundary

sea

lake

Fig. 4.1

Describe the possible impacts of climate change on the environment and on the people living in the Mekong river basin area.

Use information from the diagram in your answer.

Specimen answer

If climate change continues there will be more snow melt entering the river (✓). This may cause flooding (✓) which will mean people living near the river will lose their homes, become unemployed and it may also spread water-borne diseases. However, if managed the water could also be used for irrigation (✓) so more rice crops could be grown, or it could be used to generate hydroelectric power which would improve energy security (✓) for the people living there.

If sea level rises, there will be coastal flooding and people will be forced away from their homes (✓). That will affect fishing in the sea so food supply (✓) to the cities will be reduced.

Climate change creates more extreme weather. This may change the dry season (✓) and mean current crops can no longer grow well (✓) so people may be malnourished and will not have money (✓) to purchase other things they need.

Mark awarded = 6 out of 6

Examiner comment

The ticks indicate where marks were awarded. The candidate has written a very good response that describes the impacts on the environment and on the people living in the area. The response uses information in the diagram and incorporates that with more syllabus knowledge of the impacts of climate change. Full marks have been awarded.

To improve the response even further, additional details could also have been added. For instance, the candidate stated that sea level will rise, but they could also have explained that the rise is due to increased global temperatures causing the thermal expansion of sea water.

This question assesses AO1 and AO2. Understanding the impacts of climate change is AO1 but applying that understanding to the context given in the question is AO2.

Common mistakes

In questions that require two aspects to be described, candidates often focus on one aspect and therefore cannot be awarded full marks, regardless of how good their response is. In this question, a maximum of four marks is available for describing the impacts on the environment and a maximum of four marks is available for describing the impacts on the people. Therefore, to achieve full marks both aspects must be described.

Total mark awarded = 19 out of 24

Question 5

Question 5(a)(i)

- 5 The graph in Fig. 5.1 shows data for total population of high-income economy countries (HICs) and low-income economy countries (LICs) between 1960 and 2015.

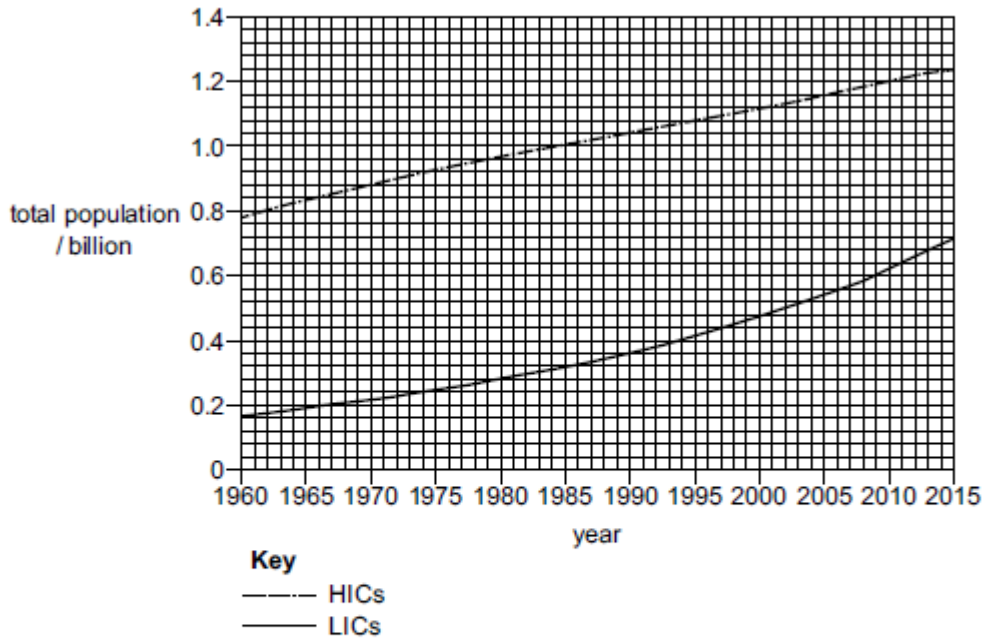


Fig. 5.1

- (a) (i) The data in Fig. 5.1 show a percentage increase in population of 59% for HICs from 1960 to 2015.

Calculate the percentage increase in population for LICs from 1960 to 2015.

Give your answer to 2 significant figures.

Specimen answer

280%

Mark awarded = 0 out of 2

Examiner comment

The candidate has given an incorrect answer and has not shown any working so no marks can be awarded. The mark scheme states that a mark is available for giving the final answer to two significant figures. As no working is shown, it's impossible to deduce how the final answer was determined so the mark for the correct number of significant figures cannot be awarded.

Common mistakes

Candidates often find calculating percentage change difficult. The formula is:

$$\frac{\text{new value} - \text{old value}}{\text{old value}} \times 100$$

If the final answer is positive, it indicates a percentage increase and if the final answer is negative, it is a percentage decrease. Candidates would benefit from practising these calculations using a range of environmental data.

Question 5(a)(ii)

- (ii) Use the data to compare the trend in population for LICs and for HICs between 1960 and 2015.

Specimen answer

The population of HICs has increased proportionally between 1960 and 2015 whereas the population of LICs increased proportionally until 1985 and then increased more rapidly.

The population of LICs is always below that of HICs but the populations are getting closer to each other. For instance, in 1960 the difference was 0.62 whereas in 2015 it was 0.52.

Mark awarded = 2 out of 2

Examiner comment

The candidate has made two very good comparisons and has been awarded full marks. Both descriptions state which category of country is being described, include the dates and are clearly comparative.

This question assesses AO2 as it involves reporting trends.

Common mistakes

The response includes a very good data quote, but it contains an error. The difference in population is 0.62 billion, not 0.62. If data is taken from a table or a graph, it's important to check if the unit says thousands, millions or billions. This error could have been spotted if the response was checked carefully.

Question 5(b)

- (b) Fig. 5.2 shows data for the percentage of the total energy generated from fossil fuels for HICs and LICs between 1960* and 2015.

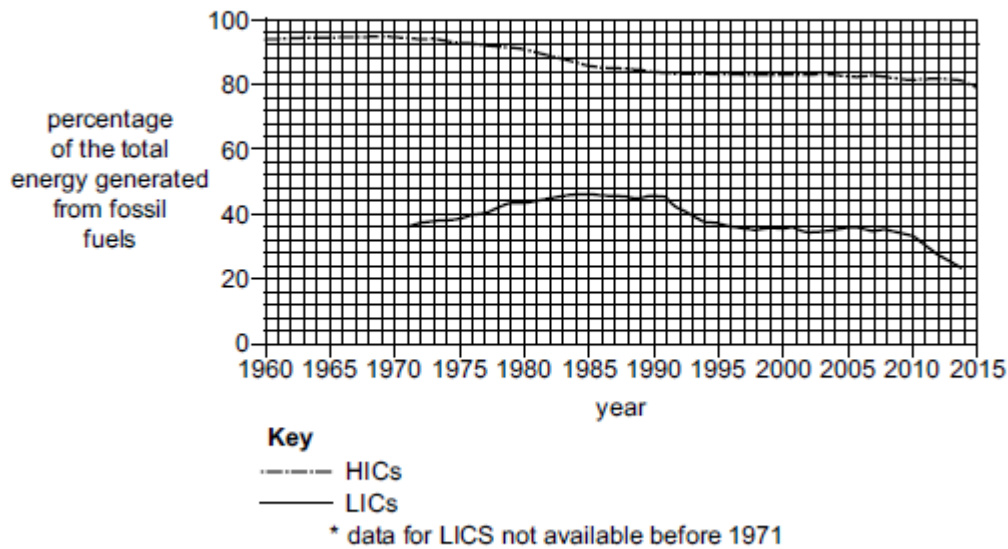


Fig. 5.2

- Fig. 5.3 shows data for the percentage of the total energy generated from renewable energy resources for HICs and LICs between 1990 and 2015.

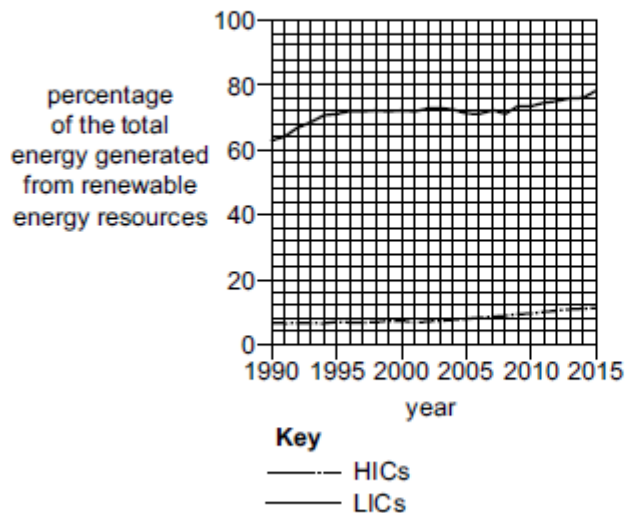


Fig. 5.3

Explain the trends in the percentage of the total energy generated from fossil fuels and renewable energy resources in HICs and LICs.

Use data from Figs. 5.1, 5.2 and 5.3 to support your answer.

Specimen answer

HICs generate a greater percentage of their energy from fossil fuels than LICs (✓). Perhaps HICs can afford to extract fossil fuels or buy (✓) and import them whereas LICs cannot. Both LICs and HICs are using less fossil fuels (✓) in 2015 than they did in 1971.

LICs and HICs are using more renewables than they did in 1990 (✓). However, the LICs have increased their use more than the HICs (✓).

Mark awarded = 5 out of 8

Examiner comment

The ticks indicate where marks were awarded. The candidate has been awarded five marks but could have gained more marks if they had answered all aspects of the question. The command word for the question is 'explain' but the response mainly describes the trends rather than explains the trends. In addition, the question asks for data to be used from Figs. 5.1, 5.2 and 5.3. The response only uses data from Fig. 5.2 and 5.3 and therefore marks for using the population data have been missed. When describing or explaining trends, a comparative data quote is always advisable.

This question assesses AO1 and AO2. Understanding energy resources is AO1 and using data given in the question is AO2.

Common mistakes

Questions requiring longer responses should always be planned before starting to write. When planning a response candidates should consider:

- What does the command word require me to do?
- How many points do I need to make to get full marks?
- Have I thought of answers to all aspects of the question?
- Can I make a comparative data quote?

Total mark awarded = 7 out of 12

Cambridge Assessment International Education
The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA, United Kingdom
t: +44 1223 553554
e: info@cambridgeinternational.org www.cambridgeinternational.org

© Cambridge University Press & Assessment 2022 v1