Cambridge International AS Level

ENVIRONMENTAL MANAGEMENT **8291/23**

Paper 2 Management in Context **May/June 2025**

MARK SCHEME

Maximum Mark: 80

Published

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:   Marks must be awarded in line with: • the specific content of the mark scheme or the generic level descriptors for the question   • the specific skills defined in the mark scheme or in the generic level descriptors for the question   • the standard of response required by a candidate as exemplified by the standardisation scripts.
GENERIC MARKING PRINCIPLE 2:   Marks awarded are always **whole marks** (not half marks, or other fractions).
GENERIC MARKING PRINCIPLE 3:   Marks must be awarded **positively**:   • marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate   • marks are awarded when candidates clearly demonstrate what they know and can do   • marks are not deducted for errors   • marks are not deducted for omissions   • answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.
GENERIC MARKING PRINCIPLE 4:   Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	‘List rule’ guidance For questions that require *n* responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards *n*. • Incorrect responses should not be awarded credit but will still count towards *n*. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first *n* responses may be ignored even if they include incorrect science.

6	Calculation specific guidance
	Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.
	For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.
	For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.
	Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.
7	Guidance for chemical equations
	Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.
	State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
✔	correct point or mark awarded
✘	incorrect point or mark not awarded
BOD	benefit of the doubt given
TV	response is too vague or there is insufficient detail in response
ECF	error carried forward applied
∧	information missing or insufficient for credit
I	incorrect or insufficient point ignored while marking the rest of the response
R	incorrect point or mark not awarded
LNK	two statements are linked
SEEN	point has been noted, but no credit has been given or blank page seen

Annotation	Meaning
●	key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen
BP	blank page
A1	Assessment Objective (AO), number corresponds to AO**1**, AO**2** etc.
L1	Level of Response. Number indicates the level awarded to the response (mark scheme details mark ranges for each level)
✔ 1	correct awarding one mark from marking point or marking group 1. similar numbered ticks are used for marking point or marking groups 2, 3, 4 etc.
NAQ	response has not answered question
CON	contradiction in response, mark not awarded

Question	Answer	Marks
1(a)	*any three from:* MP1 most people in all regions view recycling as extremely important; MP2 Africa has highest percentage; MP3 Oceania has lowest percentage; MP4 comparative data quote e.g. Europe is greater than North America;	**3**
1(b)(i)	*any two from:* *benefits (max 1):* MP1 limits (detailed / explained) responses; MP2 easy to answer; MP3 quick to analyse; MP4 quantifiable; *limitations (max 1):* MP5 no category for, 'do not know' / no opinion / no personal response; MP6 limits detail in answers / does not allow for detailed answers; MP7 difficult to choose between the categories;	**2**
1(b)(ii)	*any one from:* MP1 representative sample; MP2 large sample; MP3 reduces bias;	**1**
1(c)	*any three from:* MP1 lack of facilities; MP2 lack of understanding of what can be recycled; MP3 lack of trust in recycling programmes; MP4 inconvenience / time consuming; MP5 lack of government support / legislation; MP6 existing waste disposal methods;	**3**

Question	Answer	Marks
1(d)(i)	*any four stated or developed:* MP1 does not biodegrade; MP2 can be ingested by marine life / cause choking to marine life; MP3 can entangle marine life; MP4 risk of suffocation; MP5 form microplastics; MP6 bioaccumulation; MP7 bioaccumulation described; e.g. build-up of toxins within an organism / ingested faster than can excreted; MP8 biomagnification; MP9 biomagnification described: e.g. increase in concentration of pollutants up the food chain;	**4**
1(d)(ii)	*any two from plastic fibres:* MP1 can reduce land required for crops / land can be used to grow food instead; MP2 water not needed to water a crop; MP3 a method of recycling or disposing of plastic; MP4 reduces the plastic waste in the ocean; MP5 uses less energy; MP6 less CO_2 produced;	**2**

Question	Answer	Marks
1(e)	*any four from:* *benefits (max 3):* MP1 reduces quantity of waste / reduces waste in landfill; MP2 quick method; MP3 small area of land needed; MP4 heat generated can be used to heat homes or produce electricity / energy dense; MP5 safely disposes of plastics that are contaminated; *limitations (max 3):* MP6 produces toxic substances / air pollution; MP7 named example: e.g. particulates / acidic gases / NOx / CO_2; MP8 stated impact or air pollution e.g. acid rain / global warming / respiratory problems / impact on crop yield; MP9 smell; MP10 need specialist equipment e.g. tall chimneys; MP11 (high) energy requirement;	**4**

Question	Answer	Marks
2(a)(i)	*any one from:* MP1 not everyone knows the species of moth; MP2 public are not experts in identifying moths;	1
2(a)(ii)	so results across the country can be compared (for different weather conditions);	1
2(b)(i)	MP1 light attracts moths; MP2 fall into container;	2
2(b)(ii)	to prevent dehydration (of moths) / for moths to drink;	1
2(b)(iii)	*any two from:* MP1 species other than moths are collected; MP2 only attracts moths active at night; MP3 uses electricity / energy (which is expensive); MP4 non-target species may eat moths; MP5 moths may get killed by flying too close to light; MP6 difficult to use in wet/windy conditions;	2
2(c)(i)	420;	1
2(c)(ii)	*any two from:* MP1 fluctuating population; MP2 overall decline from year 1 to year 50; MP3 population starts to recover after 32 years; MP4 difficult to determine if moth population declining, requires more data / time ;	2
2(d)(i)	*any three from:* MP1 increase crop yield / number of fruit on tree; MP2 increase profit; MP3 max two examples of how profit can be used to increase food security e.g. reinvest in seeds / new crops / machinery;; MP4 MP1 leads to lower food prices;	3

Question	Answer	Marks
2(d)(ii)	*any two from:* MP1 25–49% / 10–24% are most frequent; MP2 most dependent crops are within the tropics; MP3 relevant quoted data e.g. North America is 10–24% ;	2
2(e)	MP1 plant as first trophic level and four trophic levels total; MP2 arrows pointing correctly; plant → moth → bluetit → owl	2
2(f)	*any two from:* MP1 shows the total number of individual organisms at each, food chain level / trophic level; MP2 does not take into account biomass of (organisms); MP3 top level may be parasites; MP4 small number of producers could support larger number of smaller consumers / ORA;	2

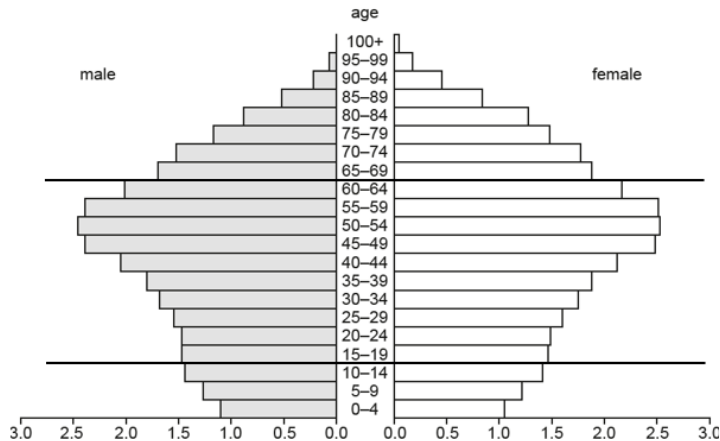| Question	Answer	Marks
3(a)	*any three from:* MP1 higher temperatures; MP2 drought; MP3 less rainfall; MP4 vegetation drier;	**3**
3(b)(i)	MP1 axes labels e.g. y-axis label: number of (recorded) wild fires AND x-axis: year; MP2 sensible linear scale, plotted points occupy half the grid; MP3 6–7 bars of correct height; MP4 bars drawn with a ruler and equal width and not touching;	**4**
3(b)(ii)	*any one from:* not all fires reported; AVP;	**1**
3(c)	*any three from:* MP1 global warming / increased temperatures; MP2 more evaporation; MP3 more convection; MP4 more moisture to form clouds;	**3**
3(d)(i)	*any one from:* MP1 lower value (than 2000 value); MP2 (from 1900 to 2000) gradually increasing;	**1**
3(d)(ii)	*any two from:* MP1 based on different theories / policies; MP2 different data used / stated example e.g. temperature; MP3 biased data; MP4 improved or different technology / knowledge;	**2**

Question	Answer	Marks
3(e)(i)	*any one from:* MP1 increased temperatures can melt ice; MP2 many research bases on ice shelfs; MP3 loss of habitat / loss of biodiversity;	**1**
3(e)(ii)	*any three from:* MP1 Antarctic Treaty / legislation / international agreement; MP2 people not allowed to enter protected areas / restricted activities; MP3 waste management / waste taken away from Antarctica; MP4 permits for travel; MP5 guides required; MP6 restriction of tourist / ship numbers;	**3**

Question	Answer	Marks
4(a)(i)	MP1 4.424; MP2 4.4;	**2**
4(a)(ii)	*any five from:* MP1 increase cost of water; MP2 greater demand / demand greater than supply; MP3 more water intensive e.g. more manufacturing or use of domestic appliance; MP4 increased burden on sanitation services; MP5 leads to contamination of water; MP6 disruption of water cycle; MP7 more run-off; MP8 more groundwater extracted;	**5**
4(b)(i)	*any five from:* MP1 plants remove carbon dioxide from the atmosphere; MP2 carbon dioxide + water → oxygen + glucose; MP3 by photosynthesis; MP4 reduces impact of, global warming / climate change; MP5 habitat for organisms / increase biodiversity; MP6 absorb / trap atmospheric pollutants e.g. particulates; MP7 increase interception of rain; MP8 trees can cool local temperatures;	**5**
4(b)(ii)	MP1 7438(.380); MP2 people / km^2;	**2**

Question	Answer	Marks
4(b)(iii)	*any two from:* MP1 (availability) of jobs; MP2 (rate of pay) for jobs; MP3 cost of healthcare; MP4 cost of land / cost of houses; MP5 level of taxation; MP6 cost of education; MP7 available transport services;	**2**
4(b)(iv)	*any four from:* MP1 relief of land / terrain **AND** low land enables more building / mountains, limits building / flood plains more liable to flood; MP2 tectonic activity / natural disasters / earthquakes / volcanoes / tsunamis **AND** discourages settlement; MP3 extreme weather / extreme temperatures / desert conditions **AND** prevents or discourages settlement; MP4 enough water **AND** to grow crops / human survival; MP5 abundance of resources **AND** e.g. coal/oil/wood/fishing enables trade or provides food; MP6 high soil fertility **AND** enables enough food to be grown; AVP;	**4**

Question	Answer	Marks
4(c)(i)	 MP1 line drawn where two bars meet between 65–69 and 60–64; MP2 line drawn where two bars meet between 15–19 and 10–14;	2
4(c)(ii)	*any two from for a LIC:* MP1 higher number of young dependents; MP2 wide base; MP3 fewer people reach older age; MP4 tapers or become narrower / height of pyramid lower;	2