CAMBRIDGE
International Education

Cambridge International AS Level

ENVIRONMENTAL MANAGEMENT **8291/22**

Paper 2 Management in Context **October/November 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 October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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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	<u>'List rule' guidance</u> 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
	blank page
	Assessment Objective (AO), number corresponds to AO**1**, AO**2** etc.
	Level of Response. Number indicates the level awarded to the response (mark scheme details mark ranges for each level)
	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.
	response has not answered question
	contradiction in response, mark not awarded

Question	Answer	Marks
1(a)(i)	**M1** 1171.4; **M2** rounded correctly / 1171;	**2**
1(a)(ii)	**M1** idea that some (environmental) factors, <u>increase</u> population density / <u>decrease</u> population density; *any three factors described:* **M2** suitable **climate** e.g. weather not too hot or not too cold / enough rain; **M3** relief of **land** e.g. not too hilly; **M4** suitable **soil** fertility (to grow crops); **M5** (availability of, or access to) natural resources / (natural) **energy** / **food** / **minerals**; **M6** (availability of, or access to) **water** (supply); **M7** low risk of natural hazards; **M8** access to coast, for fishing / recreation / trade / transport;	**4**
1(b)	**M1** correct plotting: male = 5% **and** female = 3%; **M2** same width bars;	**2**

Question	Answer	Marks
1(c)	*total four from:* *max three increase (to 2060):* **M1** improved health care; **M2** improved sanitation; **M3** economic position of Bangladesh improves / becomes a HIC or HMIC; **M4 stated** economic or social reason for **migration to** Bangladesh e.g. for jobs, for education, for housing, to escape conflict; *max three decrease (2060 onwards)* **M5** improved availability of contraception; **M6** improved education about contraception; **M7** improved, education / opportunities for women; **M8** limited availability of stated resource e.g. water, food, energy; **M9** impact of climate change / stated impact e.g. flooding;	**4**

Question	Answer	Marks
1(d)(i)	*any two from:* **M1** Bangladesh has, low rank / low score **and** will take (100 / many) years to improve; **M2** impacts (of climate change) are ongoing / climate change is ongoing; **M3** will need investment, to become climate ready; **M4** high population will be affected by climate change; **M5** (this will) lead to migration; **M6** stated climate change impact e.g. extreme weather / flooding / sea level rise;	**2**
1(d)(ii)	**M1** axes labels: score **and** all years indicated / year; **M2** suitable linear scale whereby plotted data occupies at least half the grid; **M3** bars of equal width **and** equally spaced **and** not touching; **M4** 5 correct plots;	**4**

Question	Answer	Marks
2(a)	*any two from:* **M1** identifies threat **status** of organisms or species; **M2** monitors, organisms / ecosystems; **M3** raises awareness; **M4** aims to influence policies or laws in favour of biodiversity;	**2**

Question	Answer	Marks
2(b)	*any two from:* **M1** increased, rainfall / flooding / sea level rise, washes away nests; **M2** increased, storms / wind / extreme weather, blows away nests; **M3** increased temperature / lack of rainfall, dries out or cracks mud; **M4** loss of land due to sea level rise so less available land to build nests; **M5** this increases competition for available land;	**2**
2(c)	**M1** phytoplankton; **M2** total of four levels **and** with arrows in correct direction; phytoplankton → small fish → large fish → albatross	**2**
2(d)(i)	**M1** don't need to kill the albatross; **M2** (albatross are) listed in (IUCN) Red List / idea of being endangered or threatened;	**2**
2(d)(ii)	**M1** 3.88 μg per g circled; **M2** biomagnification / concentration (of toxins) increases up a food chain;	**2**
2(e)	**M1** tag or (radio) tracker fitted to bird; **M2** (location transmitted which is) received by GPS;	**2**
2(f)(i)	tally used with 34 shown;	**1**
2(f)(ii)	using **large** numbers of people / general public, to obtain data;	**1**

Question	Answer	Marks
2(f)(iii)	*total four from:* *max three benefits:* **M1** large area can be sampled; **M2** do not need to go to where albatrosses are / Antarctica is difficult to get to; **M3** does not disturb albatrosses / does not disturb environment; **M4** quick to sample / quick to take images; **M5** birds are not counted twice (in static image); *max three limitations:* **M6** idea of big data / time consuming (to count or analyse all images); **M7** idea of albatross huddled together so difficult to see or count individual birds; **M8** can't be used when cloudy; **M9** expense (of satellite); **M10** cannot identify different species;	**4**
2(g)	**M1** Σ sum of (total); **M2** n number of individuals of each species (present in the sample); **M3** N total number of all individuals in all species (present in sample);	**3**

Question	Answer	Marks
3(a)	*total max four from:* *max three from building trap:* **M1** dig a hole **and** insert or bury a container; **M2** container should have a small hole or drainage in base; **M3** cover trap; **M4** cover raised slightly at sides; *max three from use trap:* **M5** leave trap for period of time; **M6** identify **and** count insects **M7** release insects;	**4**
3(b)	*correct label position for:* pioneer species; climax community; intermediate species; 3 correct = 2 1–2 correct = 1	**2**
3(c)	to obtain a representative sample / to calculate a mean value;	**1**
3(d)(i)	**D**;	**1**
3(d)(ii)	numbers increase / greater distribution, closer to the sea;	**1**

Question	Answer	Marks
3(d)(iii)	25;	**1**
3(d)(iv)	1650;	**1**

Question	Answer	Marks
4(a)(i)	*any three from:* **M1** most of Europe / Eastern Europe / Southern Europe; **M2** South Asia / Southeast Asia; **M3** (mostly) north of Tropic of Cancer / in the region of Tropic of Cancer; **M4** some countries bordering Equator; **M5 named** country e.g. Moldova / Ukraine / Bangladesh / India / Serbia;	**3**
4(a)(ii)	*any three from:* **M1** wild fires; **M2** crop failure / reduced crop yield; **M3** food insecurity / famine / food shortages; **M4** water insecurity / poor sanitation / disease; **M5** lower HEP production;	**3**
4(b)(i)	32;	**1**
4(b)(ii)	Jan **and** Feb **and** Dec;	**1**

Question	Answer	Marks
4(b)(iii)	*any two from:* **M1** low(est) rainfall / rainfall less than 5 mm; **M2** water needed for photosynthesis; **M3** green plants convert carbon dioxide and water to glucose and oxygen;	**2**
4(c)	*any two from:* **M1** thick or deep layer of humus / thick or deep layer of decaying plants or animals; **M2** high nutrients / high fertility / are fertile / high organic content; **M3** reference to, moisture content / porosity / pH / colour;	**2**
4(d)	*any three from:* **M1 compete** with native organisms (for resources); **M2** disrupt food chains; **M3** spread disease; **M4** alter habitats; **M5** (leads to) loss of biodiversity / extinction (of native species);	**3**

Question	Answer	Marks
5(a)	*any two from:* **M1** data is only for, Germany / one country; **M2** not all countries are HICs / different water **needs** between HICs and LICs; **M3** different countries **use** or extract differing amounts of water; **M4** different countries have different amounts of **available** water; **M5** no data after 2017 / data ends in 2017; **M6** unpredictable events (may change usage by 2030);	**2**
5(b)	glaciers, permafrost and swamps 1st, 3rd and 4th boxes ticked;	**1**
5(c)	*any four from:* **M1** shaft or (bore)hole, dug or drilled; **M2** to, (confined) aquifer / layer of permeable rock / porous rock / sandstone / limestone; **M3** no pump needed (to bring water to surface) / natural pressure (brings water to surface); **M4** idea of restricting or controlling flow of water (from well head); **M5** pipes to village; **M6** idea of water treatment; e.g. add iodine tablets / chlorination **M7** not all water taken from source (to maintain the system);	**4**

Question	Answer	Marks
5(d)	*any three from:* **M1** education on sustainable water use; **M2** poverty reduction; **M3** international agreement / laws / legislation; **M4** water–related aid; **M5** rationing; **M6** desalination; **M7 improved** irrigation or agricultural practices; **M8** repairing leaks from water supply / improved supply or distribution; **M9** reduce water pollution;	**3**
5(e)(i)	*any two from:* **M1** generates electricity; **M2** heats the wet sewage waste; **M3** idea of, water recycled / closed system / no extra water used; **M4** (treatment) creates safe drinking water;	**2**
5(e)(ii)	idea of waste, being contaminated / containing diseases / could lead to diarrhoea or cholera;	**1**
5(e)(iii)	**M1** [30 ÷ 7000] × 3800; **M2** 16;	**2**