Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/23**

Paper 2 Management in Context **October/November 2023**

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 2023 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 descriptors 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.

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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.

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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.

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Question	Answer	Marks
1(a)(i)	4.98(3) (million);	**1**
1(a)(ii)	*any three from:* better jobs; higher wages; education opportunities; better infrastructure; improved healthcare; internet access / communication network;	**3**
1(b)(i)	Mashonaland West;	**1**
1(b)(ii)	4 / four;	**1**
1(c)	*any three from:* takes up time; can't, have regular a job / do work; can't attend school; travel can be dangerous / might get injured;	**3**
1(d)(i)	*any two from:* consuming, contaminated water or food / untreated water; (contaminated with) sewage / containing (cholera) bacteria;	**2**
1(d)(ii)	boiling; chlorination;	**2**
1(d)(iii)	*any two from:* improving sanitation; treatment of sewage; education campaigns / awareness; stated example of legislation e.g. on pollution control / water quality;	**2**
1(e)(i)	50% circled;	**1**

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Question	Answer	Marks
1(e)(ii)	*any two from:* data is only for one year; data is not for current year; risk may vary month to month / depend on season; risk may be different in within each area; does not say when mosquitos are active; doesn't include standing water / breeding grounds; methods to reduce risk aren't known e.g. vaccination / use of nets; doesn't show settlement locations e.g. which area people are in; stated example of a limitation of data intervals e.g. 5–99 is broad;	**2**
1(e)(iii)	*max 4 from each strategy:* ***antimalarial drugs:*** ***benefits:*** work quickly; stop parasite multiplying / kill parasite; idea of protected all day / reduces number of people (getting) infected; ***limitations***: expensive; short-term fix; not guaranteed; side-effects; still get bitten by mosquitos; must be taken in advance; lack of access to medical / limited availability for some countries; ***mosquito nets:*** ***benefits*** controls vector / stops mosquito bites; readily available; easy to use; can be used on door or windows; ***limitations****:* have to stay under them / mosquitoes can enter during entry or exit idea of not practical to use during day get damaged easily	**5**

Question	Answer	Marks
2(a)	*plan 2 has:* greater number of months / sampling repeated / more data; more representative of the year / concentrations may vary each month / variables change; allows for anomalies to be identified;	**3**
2(b)(i)	2;	**1**
2(b)(ii)	D **AND** 5;	**1**
2(b)(iii)	safe **AND** concentration less than safe limit or less than 20; OR limit the amount of fish eaten **AND** close to safe limit or may fluctuate over 20	**1**
2(c)(i)	A;	**1**
2(c)(ii)	*any one from:* number of people surveyed is lower than the other sites; sample size is small; insufficient data; not representative;	**1**
2(d)	*any three from:* aquifers; wells; rivers; desalination plants;	**3**
2(e)	*use of scale*: 1 km = 1.5 cm **OR** 2000 m or 2 km = 3 cm**;** *distance of factory to reservoir:* cannot be built as distance is less than (in range) 1.46 km to 1.93 km (as less than 2 km) **OR** 2.2 cm to 2.9 cm (as less than 3 cm);	**2**

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Question	Answer	Marks
3(a)	*any three from HEP station and their dams:* flood large areas / loss of land; forced relocation of people; restrict (downstream), water flow / irrigation; silting; risk of dam bursting; require, maintenance / expertise / skilled workers; affects migration; requires rainfall or water source / effected by drought; requires specific terrain e.g. mountainous / valley;	**3**
3(b)	*any two **descriptions** from:* noise pollution **AND** from, machinery / transportation / vehicles; noise pollution **AND** changing animal behaviour; visual / water, pollution **AND** from, overburden / spoil; visual / water pollution **AND** from, waste / chemicals;	**2**
3(c)(i)	combustion or burning of fossil fuels; formation sulfur dioxide or SO_2 / sulfur reacts with oxygen / $S + O_2 \rightarrow SO_2$; **OR** nitrogen in the air reacts in vehicle engines; formation oxides of nitrogen or NOx; *any two from:* (their SO_2 or NOx) gas reacts / mixes / disolves with water or H_2O; to form sulfuric acid / H_2SO_4 / nitric acid / HNO_3;	**3**
3(c)(ii)	*any two from:* acidification of bodies of water; reduce fish populations; reduce crop yield / reduce foliage; acidification of soil; damage to buildings;	**2**

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Question	Answer	Marks
3(d)	*any three from:* only, central region or small area has high enough wind speed / limited amount of energy produced (in one region); difficult to supply areas far away from central region; some days will have below average wind speed; generating region can supply, two towns or central region; (centrally generated) electricity can be transported across the country;	**3**
3(e)(i)	*any three from:* *wood waste:* used as (bio)fuel / burnt; generating electricity **described** e.g. heat used to turn water into steam and turn turbine and turn generator; *sunlight:* used by, solar cells / panels / solar power; energy produced can be stored in batteries;	**3**
3(e)(ii)	abundance of other resources e.g. coal; *lack of:* expertise / workforce; lack of, technology / machinery / materials to build equipment or structures; lack of space / no places to install; lack of political will / public opposition;	**3**

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Question	Answer	Marks
4(a)(i)	arable;	**1**
4(a)(ii)	*any three from:* crop rotation; **improved** irrigation / named method e.g. trickle drip; insect control / insecticide / biological control; weed control / herbicide; fungi control / fungicide; mechanisation; selective breeding; genetically modified organisms / GM; controlled environments / greenhouses / hydroponics;	**3**
4(a)(iii)	*any three from:* less money available for, equipment / fertilisers; less, education / understanding of soil science; less-developed irrigation systems; more pressure to monoculture; more land clearance; many people or large areas of land, involved in agriculture;	**3**
4(b)(i)	D A C E (B) 2–3 correct; 4 correct;	**2**
4(b)(ii)	idea that organisms are unable to respire;	**1**
4(c)(i)	*axis labels:* y-axis: yield AND unit / thousands of tonnes AND x-axis: crop; sensible linear scale for *y*-axis such that data uses over **half the grid;** correct bar plotting; bars of equal width;	**4**
4(c)(ii)	produced to, be sold / make a profit / not used or eaten by the farm;	**1**

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Question	Answer	Marks
4(d)(i)	banana (plant);	**1**
4(d)(ii)	3;	**1**
4(d)(iii)	correct orientation of, triangle / pyramid; correct order (banana plant at bottom, weevil above, ant at top);	**2**
4(d)(iv)	(banana plants), population decreases; more weevils / more bananas eaten;	**2**
4(e)(i)	valid description of a method of systematic sampling, e.g. every nth farm;	**1**
4(e)(ii)	*any three from:* did not grow crops / were not arable farmers; declined the survey / did not want to do it; unavailable / too busy working / lack of time; unwell / had died; did not speak the same language (as the questionnaire); illiterate / could not read; questionnaires lost (in post); stopped being farmers;	**3**

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