Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/21**

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)	71 (%); 172 963;	**2**
1(a)(ii)	sectors in clockwise rank order; largest first starting at 'noon'; correct plotting; key competed and matches sector shading;	**4**
1(b)(i)	*any three from:* mechanisation; (synthetic) fertiliser; insecticide / pesticide / biological control; weed control / herbicide / fungi control / fungicide; planting multiple crops per year / intercropping; (increased use of) irrigation; reducing frequency of fallow years; large numbers of animals on limited land; crop rotation; controlled environments, greenhouses / hydroponics; irrigation; monoculture;	**3**

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Question	Answer	Marks
1(b)(ii)	*max three benefits* idea of increased efficiency; increase yields; increased profits; less workforce needed; cheaper food; meets needs of current generation; *max three negative impacts:* deforestation; habitat loss; disruption of food chains; loss of biodiversity; genetic depletion; large amounts of (animal) waste; high use of, energy / resources / water; not sustainable; salinisation / increased salinity; loss of soil, fertility / nutrients / minerals / organic content; soil compaction / erosion / leaching / eutrophication;	**4**
1(c)	random;	**1**
1(d)(i)	*any one from:* to remove stones; so they contain similar-sized particles of soil;	**1**
1(d)(ii)	*any one from:* so (ions in) water is not measured; so each sample is comparable;	**1**

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Question	Answer	Marks
1(d)(iii)	*any one from:* to get representative data for the whole field; to get a large enough sample to analyse;	**1**
1(e)(i)	*any three from:* run-off / leaching; nutrient enrichment; algae blooms; eutrophication; changes pH of **water**;	**3**
1(e)(ii)	low or no, crop yield / plant growth;	**1**
1(f)	*any three from:* air; water; organic / dead remains; microorganisms / named microorganism ; plant / animal;	**3**

Question	Answer	Marks
2(a)(i)	*any two from:* north to south of country is linked; improves connection between cities; allows faster transport of, goods / people; increased tourism opportunities; improved economy; reduces, traffic / vehicles / cars / lorries / trucks / air travel;	**2**

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Question	Answer	Marks
2(a)(ii)	*any two impacts of **building houses** with linked reasons:* loss of biodiversity; habitat destroyed / deforestation; increased urbanisation; more employment opportunities / economic growth; noise pollution (from construction); due to machinery; as more hard surfaces; increased run-off / flooding; loss of farmland;	**4**
2(b)	*any three from:* carbon dioxide is a greenhouse gas; contribute to global warming / climate change / (enhanced) greenhouse effect; stated effect of climate change, e.g. sea level rise / flooding; helps to meet carbon neutral target;	**3**
2(c)	*any two from:* (trees) **absorb** carbon dioxide; **store** the carbon; due to photosynthesis; $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$ / carbon dioxide + water → glucose + oxygen;	**2**
2(d)	*any one from:* animals can escape (the building work); to maintain animal migration routes; to link breeding grounds; to link populations;	**1**
2(e)(i)	idea of competition (with native species);	**1**

Question	Answer	Marks
2(e)(ii)	to reduce the risk of spread (of the knotweed);	**1**

Question	Answer	Marks
3(a)	*any one from:* reduction in food ; disruption of food chain; migration of prey; harder to catch prey;	**1**
3(b)(i)	bats are nocturnal / only active at night;	**1**
3(b)(ii)	*any one from:* same bat could be counted more than once; public are not experts (so may count other species);	**1**
3(b)(iii)	*any four from:* local knowledge of, where bats are / when bats active; many people can help; low cost; large amount of data can be collected; data can be collected quickly; raises awareness of the animal;	**4**
3(c)(i)	20;	**1**
3(c)(ii)	9;	**1**
3(c)(iii)	warmer temperatures;	**1**
3(d)(i)	(white ermine) moth;	**1**

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Question	Answer	Marks
3(d)(ii)	numbers decrease **AND** they have less food to eat;	**1**
3(e)	*any two from:* wind; insects; birds; self-pollination;	**2**
3(f)	(toxic substance) is absorbed; (absorbed) faster than it is lost (from an organism) / not excreted (fast enough) ;	**2**

Question	Answer	Marks
4(a)(i)	2004;	**1**
4(a)(ii)	*any two from:* increasing demand / demand exceeds supply; increasing population; availability of, own natural reserves / named resource; accessibility of, natural reserves / named reserve; cost too high to extract own natural reserves / cheaper to buy it (than produce);	**2**
4(a)(iii)	*any one from:* reliant on other countries; cannot set own energy policies; cost of imports; possible power shortages / disruption to supply;	**1**

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Question	Answer	Marks
4(b)(i)	*any three trends from:* increase to early 1900s / peak in 1920s; fluctuates / decreases, 1910s to 1920s; decreases 1920s to 1940s; constant 1940s to 1960s; sharp decrease from 1960s; (almost) zero from 1993-5s;	**3**
4(b)(ii)	*any two from:* *increase due:* industrialisation; urbanisation; population increase; *decrease due to:* mechanisation; not mining own reserves / reserves inaccessible / reserves are exhausted / no more reserves; switch to, renewable energy / named other form of energy resource; became net importer of energy;	**2**
4(c)	transport → (deposition) → sedimentation → compaction → cementation; 1 correct = 1 mark 2–3 correct = 2 marks 4 correct = 3 marks	**3**
4(d)(i)	*any one from:* test whether questions are, suitable / clear; test whether sampling methods are suitable; identify any problems with the questions; check that answers can be easily analysed;	**1**

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Question	Answer	Marks
4(d)(ii)	*any one from:* shortage of, gas / oil; high demand / current oil and gas supplies don't meet demand;	**1**
4(e)(i)	7;	**1**
4(e)(ii)	2;	**1**
4(e)(iii)	*any one from:* too many earthquakes; probability / magnitude, of earthquakes cannot be predicted; public opposition / public feel fracking is not safe;	**1**
4(f)(i)	not located, on / near, a plate boundary;	**1**
4(f)(ii)	*any three from:* evacuation plans; drills; emergency supplies; emergency rescue teams; early warning systems / monitoring; education of public; emergency shelters; medical teams; earthquake resistant buildings;	**3**

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Question	Answer	Marks
4(g)(i)	*any three from:* heavy rainfall; low-lying land; saturated / compacted, soil; deforestation / removal of vegetation; urbanisation; storm surges / tsunamis;	**3**
4(g)(ii)	deposition of silt / silting; improves fertility of soil;	**2**

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