Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/12**

Paper 1 Theory **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)	China;	**1**
1(a)(ii)	294;	**1**
1(b)	*any two from:* financial reason qualified; inaccessible area; negative environmental impact assessment / EIA; supply and demand decision; sustainability decision; use other options / resources;	**2**
1(c)	*any one from:* soil improvement; bioremediation; tree planting; making lakes; making nature reserves; using as landfill sites;	**1**

Question	Answer	Marks
2(a)	(1880 – 1800 =) 80;	**1**
2(b)	1985–1990;	**1**
2(c)	*any three from:* increase in world population; more release from agriculture; named example / more cattle / more rice paddies; increase in industrial releases;	**3**

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Question	Answer	Marks
3(a)	land clearance / harvest of wood / slash and burn / trees cut down ;	**1**
3(b)	*any two from*: no vegetation to protect soil / less interception; so more rain hits soil surface; increased run off; fewer roots to bind the soil; increased wind erosion / fewer wind breaks;	**2**
3(c)	*any two from*: as a carbon, sink / store; maintain biodiversity; plants may be source of medicinal drugs / eq ; for sustainability of supply of forest products / food;	**2**

Question	Answer	Marks
4(a)	2055;	**1**
4(b)	*any two from*: due to better health care; better nutrition / quality of drinking water; better sanitation;	**2**
4(c)	*any two from*: use national population policies, e.g. antinatalist / reduce early marriage; increase availability of contraceptives; education of <u>women</u> (so they remain in the workforce);	**2**

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Question	Answer	Marks
5(a)(i)	use of scale; 200 (km);	**2**
5(a)(ii)	*any three from*: heavy rainfall / flooding ; storm surges; high winds ; damage qualified e.g. powerlines down / buildings destroyed / bridges swept away / loss of crops; water contamination; loss of life / injury; habitat loss;	**3**
5(b)	*any four from*: monitoring / warning; disaster preparation (plans, drills, emergency supplies and emergency rescue teams); evacuation; emergency shelters; rebuilding of damaged areas / structure of buildings; international aid; better flood defences;	**4**

Question	Answer	Marks
6(a)(i)	1979;	**1**
6(a)(ii)	*any three from:* overall decrease; for <u>both</u> large and small spills; peak number of spills in, 1974 / 1975; greater decrease in smaller spills; number of spills levelled off after 2007; supporting quoted data if relating to trend of number of spills;	**3**

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Question	Answer	Marks
6(b)(i)	*any three from*: oil is toxic; marine animals / birds / mammals / corals, killed; beaches / animals / corals, covered in oil; fishing disrupted; coats, feathers / fur affected; impacts food chain; (prevents light from reaching)plants / phytoplankton photosynthesis; oil prevents oxygen reaching water; bioaccumulation;	**3**
6(b)(ii)	*any four from*: small-scale; cannot collect all the oil; only suitable for calm seas / weather-dependent; cannot use, near coast / in shallow water; only works on, oils that float / low-density oils; cheap; simple technology; does not pollute water further; quick to use; stops the oil from spreading;	**4**
6(c)(i)	*any three from*: drill down to shale layer / rock; (pump down) liquid / chemical / sand /water (under pressure); cracks in rock formed; oil / gas, released from rock; oil / gas rises (due to pressure);	**3**

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Question	Answer	Marks
6(c)(ii)	*any three from:* pollution of (local) water sources; risk of earthquakes / tremors; contribution to, global warming / climate change; uses large quantities of water; risk of fire (from methane) / explosion;	**3**

Question	Answer	Marks
7(a)	mesosphere ;	**1**
7(b)	nitrogen; 0.04 ;	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>7(c)</td><td>
<table>
<tr><th>statement</th><th>numbered process from diagram</th></tr>
<tr><td>Greenhouse gases absorb some of the infrared radiation.</td><td>5</td></tr>
<tr><td>Some ultraviolet radiation is absorbed by the Earth’s surface.</td><td>3</td></tr>
<tr><td>Some ultraviolet radiation is reflected and absorbed by the Earth’s atmosphere.</td><td>2</td></tr>
<tr><td>The Earth re-emits infrared radiation back towards space.</td><td>4</td></tr>
<tr><td>Ultraviolet radiation travels through the Earth’s atmosphere.</td><td>1</td></tr>
</table>
one correct;
two correct;
five correct;</td><td>3</td></tr>
<tr><td>7(d)</td><td>any five from:

the country might, be small / have a small population / have a limited number of vehicles;
so effect not significant;
(emissions still produced by other sources)
e.g. factories, electricity generation;;
emissions still produced by other countries;
atmosphere has no boundaries;
so international agreement needed;
already a high level of CO2 in atmosphere / reached tipping point;
carbon removal methods also required;
e.g. carbon capture, reforestation;</td><td>5</td></tr>
</table>

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Question	Answer	Marks
8(a)	*any three from*: more water shortage in southern hemisphere / South of Equator / near Equator; named continents, e.g. S. Asia, Australia and Africa;; comment on location in relation to tropics;	**3**
8(b)(i)	*any three from:* drill a bore hole / construct a well; pump water to surface / water rises under pressure; boil / chlorinate / treat with chlorine; to sterilise / remove microorganisms;	**3**
8(b)(ii)	*any two from*: lakes; rivers; reservoirs; desalination systems; rainwater harvesting;	**2**
8(c)(i)	Haiti; Bolivia;	**2**
8(c)(ii)	*any three from:* drinking water is not contaminated with sewage; all sewage is treated so, cholera / bacterium, cannot survive; so human cholera carriers cannot spread disease; Cholera is a water borne disease; Uruguay has vaccinated its population; Uruguay has good medical facilities; Uruguay has education about hygiene;	**3**

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Question	Answer	Marks
8(d)	*any four from*: some fertiliser enters water sources / leaching; due to surface run-off / heavy rainfall; nitrates in water leads to eutrophication; further details of eutrophication;;	**4**

Question	Answer	Marks
8(e)	*Level of response marked question:* Level 3 [5–6 marks] **A coherent response is given that develops and supports the candidate's conclusion using relevant details and examples.** Indicative content and subject-specific vocabulary are generally used precisely and accurately. Good responses are likely to present a balanced evaluation of the statement. Level 2 [3–4 marks] **Development and support of the conclusion is evident, though the response may lack some coherence and/or detail.** Irrelevant detail may be present. Indicative content and subject-specific vocabulary are used but may lack some precision and / or accuracy. Responses contain evaluation of the statement, but this may not be balanced. Level 1 [1–2 marks] **The response may be limited in development and / or support.** Contradictions and / or irrelevant detail may be present. Indicative content and subject-specific vocabulary may be limited or absent. Responses may lack structure or be in the form of a list. Evaluation may be limited or absent. No response or no creditable response [0 marks] *indicative content for* Dams are the only way that increasing world demand for water can be met. *agree* large quantities of water can be stored in reservoir can supply water all year round dams can be multipurpose (therefore reducing cost) control flow of water downstream easy way of storing rainwater established technology can be small-scale as well as large-scale (good for local level)	**6**

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Question	Answer	Marks
8(e)	*disagree* limited life of many dams due to silting reduced flow of water downstream only so many sites suitable for dams (climate, terrain) some dam sites too remote to be worth developing can take years to build potential for accidents / leaks collection of rainwater / limited use of clean water e.g. limited shower time not sufficient on their own other methods of increasing supply possible, e.g. solar powered desalination plants, conserving water may help reduce demand, e.g. trickle-drip irrigation, rainwater harvesting, changes in agricultural practice, eating habits, water usage (for humans / crops / livestock)	

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