CAMBRIDGE
International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/12**

Paper 1 Theory **May/June 2024**

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.

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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.

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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)	A – combustion: B – respiration; C – photosynthesis;	**3**
1(b)	*Any two from:* Plants provide: oxygen; through photosynthesis / for respiration; food source; to provide energy; shelter; to provide protection / shade;	**2**

Question	Answer	Marks
2(a)(i)	66 years;	**1**
2(a)(ii)	T*wo from:* demand might increase / change; increase in industrialisation; urbanisation; increase in population; shortage of other sources; increase in living standards / activity; some sources are too environmentally damaging to extract;	**2**
2(b)	dead plants are buried; (intense) heat and pressure; over millions of years;	**3**

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Question	Answer	Marks
2(c)	*Any two for 1 mark:* tidal; wave; water / hydro-electric; wind; sun / solar; geothermal; biofuels / bioethanol / biogas / wood;	**1**

Question	Answer	Marks
3(a)	*Any two from:* carbon monoxide; NOx; hydrocarbons;	**2**
3(b)	*Any three from:* not 100% efficient; carbon dioxide is released into the atmosphere (still harmful / pollutant); more vehicles in use; there are other sources of air pollution; named air pollutant;	**3**
3(c)	*Any three from:* use electric vehicles; energy efficiency; transport policies / named policy / taxation; use of bicycles; (development of) public transport; car sharing / car pooling;	**3**

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Question	Answer	Marks
4(a)	separate into types of metal (owtte);	**1**
4b(i)	shaft mining / deep mining / subsurface mining;	**1**
4(b)(ii)	*Any two from:* Less land needed for mining more materials / less land clearance / less loss of habitat; Less air / water / noise / pollution (due to mineral extraction); More energy efficient to recycle; Metals are finite / mining is not sustainable;	**2**
4(c)(i)	Correct plotting at: 340 000 and 800 000; width and key;	**2**
4(c)(ii)	*Two from:* general increase; fluctuates; data comparison e.g.340 000 (1000) to 700 000 (1000) / 360 000 (1000) increase / reducing proportion;	**2**
4(c)(iii)	42.5 (%);	**1**
4(d)	*Three from:* legislation / limit extraction / quotas; Increase recycling points for metals; Sorting facilities at refuse sites; Tariffs / taxation / grants; education / raise awareness; pay / reward for recycling;	**3**

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Question	Answer	Marks
5(a)	*Four from:* lowest growth rate north of Tropic of Cancer / south of Tropic of Capricorn / in Europe / North Asia; greatest rates south of the Tropic of Cancer / in Africa / between the tropics; comparison within a continent; 1000+% in West Asia / Middle East / North West Africa / North East, South America; reference to specific growth rates;; negative growth in two countries;	**4**
5(b)	*Three from:* *Impact:* greater demand for natural resources which reduces the availability of resources; *Reasons:* shortage of water due to industrial / domestic use / pollution; shortage of food causes soil erosion / soil exhaustion; increased deforestation / land use due to increase demand for land for agriculture / housing / industry; shortage / increased demand for energy due to increase use of fuel resources / power;	**3**
5(c)(i)	financial incentive; awards; named example;	**1**
5(c)(ii)	increase financial burden on services / named example;	**1**

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Question	Answer	Marks
6(a)	74%;	1
6(b)	*Three from:* lack of infrastructure / pipes; remote locations / rural areas; lack of rainfall / water stores; insufficient money; water is contaminated / polluted / water-borne disease; population increase; conflict;	3
6(c) (i)	boiling; chlorination;	2
6(c) (ii)	*Three from:* bacterial disease / Vibrio cholerae; poor sanitation / e.g. open toilets; poor personal hygiene; faeces / waste (from infected person); through run off (to water source / ground water);	3
6(d)	*Two from:* frozen; remote location/ not near population; too deep; geology;	2

Question	Answer	Marks
7(a)	*Three from:* tectonic event / volcano; / earthquake / plate movement; causes sudden movement in ocean; creates large waves (reach land) / wave get larger as reaches shallow water / shore;	3

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Question	Answer	Marks
7(b)	*Five from:* radiation released into the ocean; radiation in the air enters ocean through rain; radiation absorbed by (named) organism / all organisms; bioaccumulation; radiation retained in organism / egestion less than ingestion; description of build up of radiation in higher trophic levels / feeds on organisms containing radiation / moves up the food chain; large fish are a high trophic level;	**5**
7(c)	*Three from:* shortage of fossil fuels; not all countries have suitable renewable sites / not weather dependent; nuclear power stations do not emit carbon dioxide; energy dense source; takes less space to generate electricity compared to renewable sites; Increase in price of other sources; Increase in demand for electricity;	**3**

Question	Answer	Marks
8(a)(i)	58333;	**1**
8(a)(ii)	labelled axes; use of a suitable linear scale, data using at least half the grid; accurately plotted bars; bars of equal width;	**4**
8(a)(iii)	*Two from:* pest / disease; (competition from) non-native species; climate change / extreme weather; water extraction; acid rain;	**2**

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Question	Answer	Marks
8(b)	*Extractive reserves:* prevents development in the area; only locals permitted to harvest in the area; harvesting / use of trees is sustainable; investment to maintain the security of the forest; *Seed Banks:* (wide range of) genetic material held; stored until suitable conditions are available; can be used in future plant breeding / increase genetic diversity; safe storage in case wild population destroyed;	**4**

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Question	Answer	Marks
8(c)	*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:* 'Commercial forests often grow only one species of tree. Growing only one species of tree is bad for wildlife. This type of forest should be banned." *agree:* one species of tree does not support a diverse range of species reduced biodiversity extinction of species examples – e.g. orangutangs and palm oil plantations trees are genetically similar increasing risk of pest or disease less likely to deal with a change in weather conditions tree species may not be native to the area	**6**

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Question	Answer	Marks
8(c)	*disagree:* demand for timber / crops is large forests are efficient way of producing crops therefore take up less land – leaving other land undisturbed without forests, sourcing materials would damage larger areas of forest – affecting habitats natural forest does not grow as efficiently as commercial forests forests provide employment and help the country's economy	

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