Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/12**

Paper 1 Theory **May/June 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 May/June 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U 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.

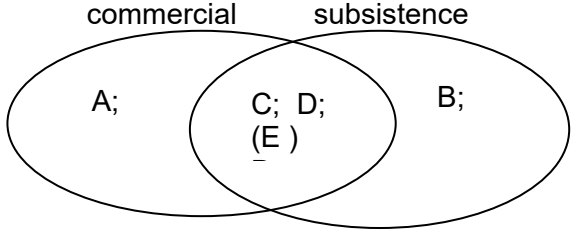
State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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Question	Answer	Marks
1(a)	(troposphere) stratosphere mesosphere thermosphere two layers correct / all three correct; all three correct in correct order; 50-80 (km);	3
1(b)	letter **O** labelled in stratosphere layer / 2nd layer from Earth;	1
1(c)	*any two from:* absorbs (harmful) UV (radiation); prevents cataracts; prevents skin cancer; prevents damage to plants; enables the natural greenhouse effect / maintains temperature of Earth;	2

Question	Answer	Marks
2(a)(i)	2.0 (km);	1
2(a)(ii)	tourism; ocean current will take oil to sandy beaches; 1 mark for industry 1 mark for valid reason for the industry stated	2
2(b)	booms: stop oil from spreading; detergent sprays: break down oil / disperse oil; skimmers: remove oil from water surface;	3

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Question	Answer	Marks
3(a)		**4**
3(b)	*any three from:* kills, beneficial / other, insects; (which) affects the food, chain / web; idea that insects are eaten by organisms in higher trophic levels; bioaccumulation; insecticide resistance in organisms; explanation of pest-resurgence; leaching/run off into water sources kills aquatic life	**3**
3(c)	use of: pest-resistant varieties (of plants) / biological control / picking off by hand / use of nets / barriers / genetically modified organisms (GMOs) / traps / crop rotation;	**1**

Question	Answer	Marks
4(a)(i)	*any three from:* data only given for, one year / 2019; lack of historic data to compare; data does not indicate whether the figures are an increase / single year doesn't show a trend; some natural disasters are not caused by climate change; AVP, e.g. loss of homes might (also) be due to other reasons rather than natural disasters, article not (necessarily) written by scientists;	**3**

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Question	Answer	Marks
4(a)(ii)	*any two from:* lack of rain; (prolonged) high pressure; effect of, El Nino Southern Oscillation / La Nina, (on ocean temperatures and evaporation); effect of climate change; deforestation; change in the water cycle;	**2**
4(a)(iii)	*any two from:* (lack of rain causes) plant death; reduced number of roots to hold soil; lack of vegetation to slow wind speed; lighter soil blown by wind; bare soil easily washed away when rain eventually falls;	**2**
4(b)	*any three from:* overcrowded / unplanned, emergency accommodation; lack of clean water; lack of sanitation; poor diet; less access to medical facilities; lack of shelter / exposure to weather; AVP;	**3**

Question	Answer	Marks
5(a)(i)	bar for trout plotted from 5.0 to 6.5 with same width as other bars;	**1**
5(a)(ii)	bacteria;	**1**

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Question	Answer	Marks
5(a)(iii)	*any four from:* fewer types of organisms / some organisms die / less biodiversity; population of carp decreases; population of snails decreases; population of, bacteria / frogs / perch / insects / plants, unchanged / increased; trout may decrease (as at edge of pH range); AVP;	**4**
5(b)(i)	*any five from:* oxides of nitrogen; released into air (by reaction at high temperatures)from engines/ vehicles/ cars; sulfur dioxide; released into air by combustion of fossil fuels; by named source, e.g. vehicles, factories, industry; dissolves in water (in atmosphere); reduces pH (of rain); precipitation as (dilute), sulfuric / nitric, (acid rain);	**5**
5(b)(ii)	*any three from:* reduce vehicle emissions; introduce transport policies/ use of electric vehicles/ examples e.g. car pooling; use catalytic converters on vehicles; reduce combustion of fossil fuels; use renewable energy; conserve energy / reduce energy waste; use flue-gas desulfurisation in chimneys/ low sulfur fuels; follow international agreements/ emissions legislation; AVP;	**3**

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Question	Answer	Marks
6(a)(i)	ref to, equator / tropics, e.g. mostly between the tropics; *plus any two further details:* South / (&) Central America; most of Africa; (South) Asia / Middle East;	**3**
6(a)(ii)	cooler climates / better control methods / AVP;	**1**
6(b)(i)	*any four from:* infected person bitten; by female (anopheles) mosquito; parasite / plasmodium, transmitted to mosquito; mosquito acts as a vector; mosquito bites new person; (parasite / plasmodium) transmitted to new person;	**4**
6(b)(ii)	*any two from:* use mosquito nets; drain swamps / breeding grounds; cover water sources; introduce fish into lakes to eat mosquito larvae; introduce sterile male mosquitoes into population; use antimalarial drugs; education of population (regarding vector control);	**2**

Question	Answer	Marks
7(a)(i)	0.4 and 0.6 plotted correctly; lines drawn to complete line graph;	**2**
7(a)(ii)	overall increase; from 1.3 to 4.35 billion tonnes / increase of 3.05 billion tonnes / levelling off from 2015 / increased production after 2004 / slow increase 1990 to 2004;	**2**
7(a)(iii)	(2.4 ÷ 4.1 × 100) = 58.5(%);	**1**

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Question	Answer	Marks
7(b)(i)	*any three from:* damage to seabed; loss of habitat; death of / damage to, marine plants / (named) marine organism; disruption to food chain; noise / activity, scares off some organisms;	**3**
7(b)(ii)	*any two from:* difficult to, police / monitor / enforce; seas are large; high, demand / pressure, for, gravel / cement; limited supplies on land;	**2**
7(c)	*any three from:* increase recycling of existing materials; increase extraction efficiency; increase efficiency of use; use legislation;	**3**

Question	Answer	Marks
8(a)(i)	30;	**1**
8(a)(ii)	correct labelling of axes; suitable linear scale such that data occupy over half of grid; correct bars plotted; bars of equal width;	**4**

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Question	Answer	Marks
8(a)(iii)	*any two from:* captive population too small; limited gene pool; animals released into wild do not survive; poaching / hunting, still continues in wild; unsuitable conditions in captivity for breeding; low reproduction rate; habitat, change / loss, in wild; AVP, e.g. only one sex remaining;	**2**

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Question	Answer	Marks
8(b)	*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 :* Protecting living organisms is more important than exploiting the planet for natural resources. *protecting living organisms is more important:* some are endangered once extinct it is not possible to get species back alternative resources available in other areas technology could be used to find alternatives to the resource – examples of resource extraction affects a whole, habitat / ecosystem opportunities to, recycle / re-use existing resources or sustainable resources exist, e.g. sustainable forestry plantations we need some species in order to survive, e.g. bees for pollination, medicinal plants, gene engineering (unforeseen) wider effect on food web of species going extinct	**6**

Question	Answer	Marks
8(b)	*exploiting the planet is more important:* the use of these resources creates an income to afford conservation wildlife reserves / captive breeding can then be afforded possible to relocate animals and plants resources needed to keep people, alive / healthy land may be needed for, housing / food production any type of extraction affects habitats – it is impossible to stop all resource use world population increasing so more resources needed extinction an effect of natural selection fuels are essential as an energy supply	

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