Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/12**

Paper 1 Theory **February/March 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 February/March 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	<u>'List rule' guidance</u> 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)	basalt circled; granite circled;	**2**
1(b)	3 correct = 2 marks, 1 or 2 correct = 1 mark igneous: rock A sedimentary: rock C metamorphic: rock B	**2**
1(c)	some rocks are on the surface (of the Earth); cool more rapidly / cool at different rates / depends on rate of cooling; slower rate of cooling causes large crystal size;	**2**

Question	Answer	Marks
2(a)(i)	(in 1980) 35 AND (in 2000) 105; (increase = 105 – 35 =) 70;	**2**
2(a)(ii)	*any three from:* both increase; East Asia uses more fertiliser than South America in each year; South America increases gradually whereas East Asia rises rapidly (after 1975) / AW; suitable comparative data quoted; idea that use in East Asia fluctuates more than South America;	**3**

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Question	Answer	Marks
2(b)	managed grazing; limit the number of animals grazing / rotate grazing land / don't allow grazing all year / AW; OR crop rotation; don't plant the same crop year on year / plant crops that fix nitrogen / plant green manure / have a fallow year / AW; OR pest-resistant crops; allow less pesticide to be used / AW; OR drought-resistant crops; allow less water to be used / allow for long periods without rain / allow for changing weather patterns; OR trickle drip irrigation; allows less water to be used / provides water at soil level / reduces evaporation / AW; OR rainwater harvesting; reduces the need for extraction of water / allows water to be stored for dry period / AW; OR any valid strategy named; any valid description of the strategy;	**2**

Question	Answer	Marks
3(a)	*any two from:* general trend identified, e.g. more widespread in 1900; in 1900, malaria extended further north and south / AW; in 2000, malaria mainly limited to, tropics / central America / South America / Africa / (southern) Asia / AW; in 2000, no longer occurs in, Australia / USA / Europe;	**2**

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Question	Answer	Marks
3(b)(i)	*any three from (max two from each section):* benefits*:* easy to take; (relatively) effective at preventing malaria; limit transmission; drugs cheaper than creating vaccines; AVP; *limitations:* drugs are costly / AW; drugs are not widely available / AW; not everyone wants to take drugs / AW; drugs have side effects / cannot take some when pregnant / named side effect; not 100% effective / AW; drugs are only one strategy / drugs should be used in combination with other strategies; malaria resistance to drugs;	**3**
3(b)(ii)	vector control; removing standing water / draining wetlands / insecticide-treated nets (ITNs) / residual spraying / AVP; OR eradication; vaccines / widespread use of insecticides / idea of genetically modifying mosquitoes / toxic fungi / AVP;	**2**

Question	Answer	Marks
4(a)(i)	mineral – water – microorganisms 1 correct; 3 correct;	**2**
4(a)(ii)	clay → silt → sand 1 correct; 3 correct;	**2**
4(b)(i)	sandy loam;	**1**

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Question	Answer	Marks
4(b)(ii)	40–73% silt **AND** 0–33% sand **AND** 27–40% clay; sum of the percentages = 100%;	**2**
4(c)	*any four from:* build terraces; build bunds; use wind breaks; add organic matter to the soil; control irrigation / control drainage; vegetation to reduce bare soil; use contour ploughing;	**4**

Question	Answer	Marks
5(a)(i)	(sustainable fisheries means that) species can be harvested to meet the needs of the present / AW; (and also) meets the needs of future generations / AW;	**2**
5(a)(ii)	*any two from:* stocks of marine species, can still be harvested / remain productive and healthy / AW; provides food for humans; source of, protein / vitamins / minerals / oils; incomes / jobs, are maintained into the future;	**2**
5(b)(i)	*any three from:* overall increase; increases (rapidly) from 1–5; relatively stable from 5–13 / 5–7; fall from 7–8 / 5–8; increases after 8 / 8–12; catch 5–6 times greater in 13 than in 1 / comparative data quote;	**3**

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Question	Answer	Marks
5(b)(ii)	(reading values from graph) 3500 AND 600; (calculation) (3500 – 600 = 2900, 2900 ÷ 600 × 100 =) 483.33; (rounding) 483;	**3**
5(c)(i)	*any two from:* slow to mature AND financial return is slow / cost more to keep; need deep water AND may not grow well in shallow water / providing good conditions for growth may be difficult / AW; need deep cages AND may be expensive / requires large initial investment / difficult to design; predatory AND may not survive on artificial feed / may only eat live food; AVP;	**2**
5(c)(ii)	*any three from:* creates waste / creates sediment / lowers water quality; eutrophication; increases the demand for, artificial feed / fish food / fish protein; pesticides pollute the water; protects natural stocks; reduces the damage caused by fishing; farmed species can escape into the wild; spread disease; food chains affected;	**3**

Question	Answer	Marks
6(a)(i)	between 5° and 20° North / South of the Equator; ocean (surface) temperature of at least 27 °C; ocean depth of at least 60 m;	**3**
6(a)(ii)	number increases; wider distribution (further away from the tropics); (more areas have) high enough water temperatures; increase in sea levels results in more areas with deep water;	**3**

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Question	Answer	Marks
6(b)	*any three from:* damage to infrastructure / flooding; sewage / dead animals / named pollutant; lack of clean drinking water/ have to drink contaminated water; sewage contains bacteria / cholera; standing/stagnant water; increase in breeding site mosquitoes; increase in vectors / ref to malaria;	**3**
6(c)	*any two from:* flooding; loss of life; financial losses / loss of jobs; damage to buildings and infrastructure; loss of, crops / animals; malnutrition / famine;	**2**

Question	Answer	Marks
7(a)	*line graph with:* both axes labelled; linear scale on both axes with a scale that uses at least half of the grid; all 5 data points plotted to within ±half of a small square; point-to-point lines drawn with no extrapolation;	**4**
7(b)	93 ±2; (value to be fixed once graph plotted) indication shown on graph at 2000;	**2**
7(c)(i)	(percentage change) allows each country to be directly compared / takes into account different total quantities / population / industrialisation;	**1**

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Question	Answer	Marks
7(c)(ii)	*any five from:* developing renewable energy sources; taxation / increase price of oil / fuel; reduce extraction / imports; reduce amount of oil used as a raw material / plastic / electricity generation; exploiting other existing non-renewable energy sources / named example e.g. nuclear / coal; increase efficiency in oil use; transport policies / idea of public transport explained; use of electric cars / ban oil powered vehicles; government incentives to buy electric cars: AVP;	**5**

Question	Answer	Marks
8(a)(i)	2.5 (%);	**1**
8(a)(ii)	water vapour / atmospheric water;	**1**
8(a)(iii)	idea that water cycles / volumes change;	**1**
8(b)	*any two from:* aquifers; wells; rivers; lakes;	**2**

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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 both statements. 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:* *agree:* (construction will) create jobs / generate income (reservoir will) provide drinking water / allow crops to be irrigated / allow animals to be raised / create new habitats (generate opportunity for) tourism / fishing industry / additional population / generating hydroelectric power / prevent flooding downstream / effect on biodiversity qualified *do not agree:* (construction will mean people) lose their homes / forced to move / community destroyed / farmland lost (reservoir may) affect people downstream that use the river / impact migratory fish / destroy important habitats / trap sediments / lower water quality / effect on biodiversity qualified	**6**

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