Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/13**

Paper 1 Theory **October/November 2022**

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 2022 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.

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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)(i)	10 (%);	**1**
1(a)(ii)	52 (million km^2);	**1**
1(b)	crops produce more protein than livestock / ora; crops use less agricultural land than livestock / ora; crops more efficient method of producing protein;	**3**
1(c)	*any two from (list rule applies):* improved varieties; use of fertiliser; use of irrigation; pest / disease control/ biological control / pesticides; weed control / use of herbicides; crop rotation; intercropping;	**2**

Question	Answer	Marks
2(a)(i)	increase in proportion of under-sized fish until 2004; (from 2004)increase in proportion of large fish until 2012; (from 2012) increase in proportion of under-sized fish again until 2020; Overall trend 1996 to 2020 increase in under-sized fish	**3**
2(a)(ii)	proportion of fish that can be legally caught is reducing; (therefore) reduction in proportion of legal-sized / large / breeding fish available / fish not growing to maturity;	**2**
2(b)	*any two from:* use a larger mesh size; stay away from breeding areas; close monitoring of catches;	**2**

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Question	Answer	Marks
3(a)	increases the depth (of the river); increases the width (of the river);	**2**
3(b)	*any four from:* increase / construct flood defences; early warning systems; land zoning / do not build on flood plains; construction of relief drains; emergency drills / relief shelters; straightening of water courses;	**4**

Question	Answer	Marks
4(a)(i)	670 000 × 150; 100 500 000 / 100.5 million (m^3);	**2**
4(a)(ii)	2019;	**1**
4(a)(iii)	10 000 (tonnes per day);	**1**
4(b)	*any three from:* bioremediation; use of bacteria / microbes to convert toxic materials; soil capping; addition of topsoil above the rubbish layer; replanting; adding trees / grasses to hold layer and establish vegetation; addition of fertilisers; creation of animal habitats; introduction of animal species to develop a food web;	**3**

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Question	Answer	Marks
4(c)	sensible linear scale such that plots occupy at least half the grid; axis labels; 3 bars accurately plotted;	**3**
4(d)	*any three from:* transporting materials to another country uses fossil fuels; transporting increases risk of accidental pollution; waste more likely to get mixed therefore harder to process; large quantities of waste in one place may cause pollution; waste may not be treated effectively / may be burnt ; AVP;	**3**

Question	Answer	Marks
5(a)(i)	*renewable only:* biofuels *no CO2:* nuclear *both:*(tidal), wave, geothermal, solar, wind 2 correct; 4 correct; 6 correct;	**3**
5(a)(ii)	hydroelectric;	**1**
5(b)	*any three from:* may cause earthquakes / seismic activity; risk of pollution of water sources; damage to local area / visual pollution; animal habitats damaged; uses large volumes of water (which might be in short supply);	**3**

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Question	Answer	Marks
5(c)	*any three from:* use of electric / hybrid vehicles; use of more efficient engines; example e.g. limit size of engines / stop start technology; limit vehicle use / example; encourage walking / use of bicycles / public transport; taxation;	**3**

Question	Answer	Marks
6(a)(i)	(400 000 000 ÷ 90 =) 44 (million trees);	**1**
6(a)(ii)	*any three from:* use of land for agriculture; use of wood for fuel / construction / furniture / logging; to clear land for mineral extraction / mining; use of land for towns / urbanisation / roads / industry; use of land for reservoirs / dams;	**3**
6(a)(iii)	*any four from:* lack of water / drought; waterlogging; lack of soil nutrients / poor soil; pest problem / grazing livestock; disease problem; vandalism / human damage; soil pollution; AVP;	**4**

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Question	Answer	Marks
6(b)	*any four from:* decreases evapo–transpiration; fewer leaves of trees acting as condensation points; no reduction in temperature allowing for condensation / precipitation; less effect of trees, slowing wind speeds / causing clouds to move more slowly; groundwater stores remain as not taken up by tree roots; reduction of interception (by plants); reduction in infiltration rates; run–off increases; AVP;	**4**

Question	Answer	Marks
7(a)(i)	*any four from:* reduction (in urban population) in Eastern Europe / named country; reduction in part of middle East / west Asia / Syria; increase of 0–1.6% in (most of) Europe / North America / South America / Australia / named country; increase of 1.6–3.2% in southern Asia / some of Africa / Central America / named country; highest increase / more than 3.2% in Africa / parts of Middle East / South West Asia / named country;	**4**
7(a)(ii)	*any four from:* for employment opportunities; better health services; better standard of living; better education; moving away from natural disasters, e.g. drought, flooding; fleeing from, war / conflict / persecution; AVP;	**4**

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Question	Answer	Marks
7(a)(iii)	*any three from:* development of unplanned housing / shanty towns / lack of housing; spread of disease / lack of sanitation / shortage of clean water; pressure on schools / hospitals; unemployment; crime / illegal activity; traffic congestion; increase in air / water pollution / waste;	**3**
7(b)	axes labelled; pyramid drawn in steps for ages; pyramid shows both male and female broadly similar; broad base, tapering to a narrower top;	**4**

Question	Answer	Marks
8(a)(i)	(2.1 ÷ 7.3 × 100 =) 29 (%);	**1**
8(a)(ii)	contracting water-related disease / malaria / named example; poisoning from drinking pollutants / toxic substances in the water;	**2**
8(a)(iii)	chlorination / chemical treatment / distillation / desalination / filtration / reverse osmosis;	**1**

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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 statements. Level 2 [3–4 marks] **Development and support of the conclusion is evident, though the response may lack some coherence and / or detail.** Indicative content and subject-specific vocabulary are used but may lack some precision and / or accuracy. Irrelevant detail may be present. 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]	**6**

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Question	Answer	Marks
8(b)	*Indicative content for:* *Topic: medical treatment v water supply* *Main idea:* clean water supply is more beneficial than treatment of symptoms *Water treatment is better because:* • would benefit a wider number of people • improved system has a longer–lasting effect • less low–level illness will mean better productivity (better economy) • impacts a range of illnesses / diseases disease will not get resistant to the drugs used to treat it. less hospitals / medical staff needed who are in short supply *Water treatment / clean sources are not better because:* • lack of treatment of existing problems will cause death and hardship now so still must do some treatment • ethical issues • still likely that some incidence even with clean water supplies • a combination of clean water and medicines will be more effective	

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