Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/11**

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.

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.

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.

Question	Answer	Marks
1(a)(i)	Canada;	**1**
1(a)(ii)	20 (years);	**1**
1(a)(iii)	*any two from:* other countries will run out of lithium before Chile / large reserves; additional uses for lithium found; more demand for batteries; due to increased electric vehicle usage; due to environmental policies / government legislation;	**2**
1(b)	*any three from:* recycling; (improved) efficiency in extraction; (improved) efficiency in use; quotas / legislation / regulation;	**3**

Question	Answer	Marks
2(a)	(10 875 393 719 – 6 143 493 805 =) 4 731 899 914;	**1**
2(b)	*any three from:* proportion of, young people / children, decreases; life expectancy increasing / more old people; broadly equal numbers of all ages up to age 65 in 2100 compared to sharp decline in 1950; greater increase in 15–64/ economically active age group; quoted data to support; AVP;	**3**

Question	Answer	Marks
2(c)	*any two from:* changes to birth rate / government policies; risk of pandemic / natural disaster; war / conflict; change in attitudes (to family) / education-qualified; changes in healthcare / food supply/ water supply;	**2**

Question	Answer	Marks
3(a)(i)	1 correctly plotted; 3 correctly plotted; correct order of key; correct use of shading ;	**4**
3(a)(ii)	12 (%);	**1**
3(b)(i)	a store for seeds / a gene bank (for plants using their seeds);	**1**
3(b)(ii)	((75 000 × 100) / 24 =) 312 500;	**1**

Question	Answer	Marks
4(a)	clockwise in size order; accurate plotting; correct application of key;	**3**
4(b)	*any three from:* disrupts food chain / web; increase in the species preyed on by the fish; lack of food for predators; reduction in number of predators that feed on fish; (may lead to) extinction of some predators;	**3**

Question	Answer	Marks
4(c)(i)	*any three from:* restrictions in breeding seasons / closed seasons; ban fishing in some areas / protected areas; restrict net size / shape / pole and line method; increase in mesh size; quotas / enforcing legislation / monitoring / limit number of days; fish farming;	**3**
4(c)(ii)	*any three from:* fish migrate across national boundaries / borders; oceans are shared; international waters need international regulation / agreement; unless all countries work together the effect is limited / cooperation to avoid overfishing; some countries allow other countries to fish their waters;	**3**

Question	Answer	Marks
5(a)	<table><tr><td>(renewable)</td><td>(non-renewable)</td></tr><tr><td>biofuel</td><td>coal</td></tr><tr><td>hydroelectric</td><td>petroleum</td></tr><tr><td>solar</td><td>uranium</td></tr><tr><td>wind</td><td></td></tr></table> 2 correct 1 mark; 5 correct 2 marks; 7 correct 3 marks;	**3**

Question	Answer	Marks
5(b)(i)	*any three from:* turn off electrical devices (when not in use) / do not leave on stand-by / unplug devices; use more energy-efficient devices / examples; use of windows instead of air conditioning / electric lighting; insulation / example; adjust thermostat on air-con / heating;	**3**
5(b)(ii)	*any two from:* burning fossil fuels/ wood/ deforestation releases CO_2 / named pollutant; contributes to climate change / global warming / acid rain; named consequence of global warming / acid rain; extraction/ transport of energy resources contributes to pollution-qualified; use of resources needed to enable supply of energy to homes;	**2**
5(c)(i)	*any four from:* (cold) water pumped into ground / rocks: (onto) hot rocks; hot water returns to surface; (turns to) steam; (steam) drives / turns / spins / rotate turbine; rotates / drives / generator (which generates electricity); water is re-used / process repeated;	**4**
5(c)(ii)	*any two from:* cannot afford the development costs; abundant / cheaper supply of other energy resources; geology not suitable / hot rocks too deep;	**2**

Question	Answer	Marks
6(a)(i)	thermosphere; mesosphere; (stratosphere) troposphere;	**3**
6(a)(ii)	(from) 20 km (to) 50 km;	**1**
6(a)(iii)	**X** in stratosphere;	**1**
6(b)	*any four from:* solar radiation / short wave radiation / sunlight / rays from the Sun; Earth's surface absorbs radiation / light; Earth emits infrared (radiation) / heat; named greenhouse gas (water vapour / methane / carbon dioxide / NOx); in troposphere; greenhouse gases absorb infrared radiation/ prevents (infrared) radiation from escaping atmosphere / traps radiation;	**4**

Question	Answer	Marks
7(a)	*any three from:* movement / slide / converge / divergence of (tectonic) plates; due to convection currents; friction at plate boundary; build-up of pressure; pressure overcomes friction; release of energy / (seismic) waves; move outward (from focus / epicentre);	**3**
7(b)	*any three from:* hollow concrete building blocks, are lighter / cause less damage if they fall; strong roof, is less likely to collapse / allows for air spaces / protects from falling debris; low height, is less risk from falling / more compact; small windows reduce risk of broken glass / fewer weak spots in walls; steel pillars into solid rock provide secure / strong foundation;	**3**

Question	Answer	Marks
7(c)(i)	Richter;	**1**
7(c)(ii)	Iran;	**1**
7(c)(iii)	(208 + 2003 + 2934 =) 5145;	**1**
7(c)(iv)	*any three from:* monitoring / early warning systems in place; disaster preparation / evacuation plans in place; epicentre might be in a geographically remote / unpopulated location; land use zoning; deeper earthquakes can be less damaging;	**3**
7(c)(v)	*any three from:* traditional / family reasons; employment / livelihood; lots of natural resources in area; too costly to live elsewhere / lack of alternatives; perceive the risk is small / confident of measures in place;	**3**

Question	Answer	Marks
8(a)(i)	158 AND 74 ; ((158–74)÷74 × 100 =) 114 (%);	**2**
8(a)(ii)	general increase; rate of increase slows down / levels out;	**2**

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] *indicative content for:* Farmers should grow food crops rather than biofuel. There are food shortages in the world. *agree:* there are food shortages in the world world population increasing, more food will be needed many other energy resources instead of biofuels. poor allocation of water resources uses valuable resources such as fertilisers, pesticides growing biofuels is not carbon neutral causes additional unnecessary deforestation	**6**

Question	Answer	Marks
8(b)	*disagree:* there are also energy shortages / requirements food shortages not always caused by lack of food caused by poor food distribution / food imbalance / food waste food crops grown and exported some land is not suited for food crops but may be suited for biofuels growing biofuels has some useful by-products, e.g. compostable waste can increase revenue for countries / locals / farmers other fuel resources also use land, e.g. solar farms, mining biofuel has less environmental impact than other fuels	