Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/12**

Paper 1 Theory **February/March 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 February/March 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.

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)	basalt – igneous; limestone – sedimentary; marble – metamorphic; slate – metamorphic;	**4**
1(b)	idea that (dead) organisms are buried in layers of sediment;	**1**
1(c)	*any two from:* (if buried deep) rocks might not be cost effective to extract; concentration of desired mineral; stability of surrounding rock;	**2**
1(d)	opencast / open-pit / open-cut;	**1**

Question	Answer	Marks
2(a)(i)	*any two from:* fish are caught in nets when targeting other species; quota of that fish has already been reached; fish not of sufficiently large size to be caught;	**2**
2(a)(ii)	180 billion;	**1**
2(b)	*max three for either section:* *type:* large nets capture all fish within an area; larger volume of fish in shorter period of time; large amount of bycatch; dredge nets scrape the sea bed; damages the ecosystem; drift nets are non-selective (catch turtles, sharks etc.) *mesh:* small mesh sizes catch all fish; immature / juvenile, fish unable to breed; overfishing can occur;	**4**

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Question	Answer	Marks
3(a)	1 triple-glazed window 2 brick wall 3 double-glazed window 4 *(wooden door)* 5 single-glazed window 2 correct; 4 correct;	**2**
3(b)	*any three from*: switch off equipment when not in use / switch off lights (at night) / switch off electrical equipment rather than leaving on 'stand by'; use (of more) energy efficient equipment; re-use materials rather than manufacturing new; larger / more, windows to reduce need for electric light; use sensor-controlled lights; ventilation points; use of poster / signs / education;	**3**

Question	Answer	Marks
4(a)	*any three from:* from north of Australia; from Arafura Sea; travelled westwards / southwest / from the northeast; along coast; from Darwin to Broome; and to Timor Sea;	**3**
4(b)	*any three from:* location between 5° and 20° (north and south) of the Equator; ocean (surface) temperature of at least 27 °C; depth of water at least 60 m; AVP;	**3**

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Question	Answer	Marks
4(c)	*any two from:* damage to buildings; damage to crops / vegetation; damage to communication/ infrastructure; flooding / storm surges, in coastal areas; landslides; water contamination / water-related disease; injuries; economic impacts; homelessness; destruction of habitats;	**2**
4(d)	*any four from:* difference in population in the area; topography; availability of early warning systems to track cyclone; population alerted to risk; design of buildings and infrastructure; availability of food / water / medicines; improved healthcare; emergency services prepared; disaster preparation (plans / drills / emergency supplies / rescue teams); evacuation; emergency shelters;	**4**

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Question	Answer	Marks
5(a)(i)	suitable scale such that plot area uses more than half of grid; *x*-axis labelled AND *y*-axis labelled; correct plotting of bars; bars equal width;	**4**
5(a)(ii)	98%;	**1**
5(a)(iii)	most waste emissions already removed / reaching maximum efficiency;	**1**
5(b)	*any three from:* increase use of public transport; limit access to city centre by cars / low emissions zone / congestion charge / electronic road pricing; car pooling; increase use of, electric / low emission cars / bioethanol / LPG / CNG; ban, older / diesel, cars; promote cycling / walking; education; increase taxes for more polluting vehicles / fossil fuels;	**3**

Question	Answer	Marks
6(a)(i)	*control tap:* restricts / controls, flow of water; *filter:* takes out, particles / grit (that might block tubes); *fine tubes:* deliver water (drops) directly to plants;	**3**
6(a)(ii)	*any four from:* reduces risk of salinisation; as less water to evaporate / avoids water logging / over-watering; reduces risk of leaching; as water not wasted draining through soil; reduces amount of weed growth; only crop plant receives water; reduces volume of water used / manage / control water use; reduces run-off / soil erosion / capping; correct volume of water supplied;	**4**

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Question	Answer	Marks
6(b)	*any three from:* use fertiliser to increase, minerals / nutrients; use of improved (GM) varieties for, larger crops / hardier varieties / pest resistance; use of, pesticides / insecticides, to decrease damage to crops; remove weeds / use herbicides, to reduce competition for nutrients; mulching to increase soil fertility; high density planting / intensifying farming / intercropping, for higher yields from same, space / land; greenhouse to control growing conditions; crop rotation to control pests / diseases / increase fertility	**3**

Question	Answer	Marks
7(a)(i)	Barbados; Lebanon;	**2**
7(a)(ii)	(155 – 445 =) 290;	**1**
7(a)(iii)	*any two from:* lower birth rate than death rate; emigration / migration; famine / crop failure; disease; war; change in government policy;	**2**

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Question	Answer	Marks
7(b)	*any five from:* rewilding / recolonisation; more habitats; maintained / increased biodiversity / wildlife undisturbed; less use of fossil fuels / fewer vehicles; (so) less air pollution; less water pollution; more water available; less soil erosion; (as) less agriculture; less urbanisation; reduced habitat destruction; less industrialisation/factories;	**5**

Question	Answer	Marks
8(a)(i)	*producer:* phytoplankton; *primary consumer*: insects / zooplankton;	**2**
8(a)(ii)	*any two from:* energy lost in transfer to each level; due to movement / respiration / feeding / excretion / growth; (in general) animals larger in size at top;	**2**
8(b)	*any four from:* the water contains mercury; plankton contain mercury (from the water); (predator) fish feed on smaller organisms which contain mercury; larger fish feed on large numbers of smaller fish; predator fish near top of pyramid / trophic levels; biomagnification occurs; mercury not excreted from body / stays within cells; bioaccumulation occurs;	**4**
8(c)(i)	2.9;	**1**

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Question	Answer	Marks
8(c)(ii)	*sample point* E AND *toxic substance* chromium;	**1**
8(c)(iii)	*sample point* A AND *toxic substance* lead;	**1**
8(c)(iv)	*any two from:* because (four) toxic substances have been found ; at different points around the lake ; higher concentrations of all substances found at sampling points **A** (and **B)** ;	**2**
8(d)	*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]	**6**

Question	Answer	Marks
8(d)	*Indicative content for:* 'Management of the marine ecosystem is **not** given a high priority by countries and should be controlled by more international agreements.' *agree:* marine ecosystems are an important source of food, resources and support a large biodiversity and should be conserved the oceans have no boundaries / ocean currents always flowing water pollution will travel overfishing and the increasing human population need to be managed might encourage more efficient use of existing commodity and recycling might force new technologies that are less reliant on the oceans *disagree:* international agreements are a way of doing this, but these are difficult to put in place and can be ignored difficult to monitor if agreements are being adhered to poorer countries prevented from exploiting a source of export countries might have other priorities, e.g. climate change	

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