Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/13**

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)	**T** located in the sea / ocean; between 5° and 20° North OR South of the equator;	**2**
1(b)	ocean (surface) temperature of (at least) 27 (°C) / ocean depth of (at least) 60 m;	**1**
1(c)	*any three from:* flooding; loss of life / injuries; loss of livestock / crops; financial losses / jobs; damage to, buildings / infrastructure; contamination of water supplies / water-related diseases; food shortages / starvation;	**3**

Question	Answer	Marks
2(a)	**bitten** by (female) mosquito; transfers the (malaria) **parasite**	**2**
2(b)(i)	idea of using a natural predator / organism to control a population / pest;	**1**
2(b)(ii)	*any three from:* (insecticide treated) mosquito net; use insecticide; use mosquito repellents; drain stagnant water; spray (standing) water with oil; take antimalarial drugs; vaccination; stay inside from dusk to dawn (to avoid being bitten); wear, long sleeves / trousers;	**3**

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Question	Answer	Marks
3	**name of process** — **description of process** condensation — the change in water from gas to liquid evaporation — the change in water from liquid to gas interception — the prevention of precipitation from immediately reaching the soil surface run-off — the flow of water over the top of the soil through-flow — the movement of water through the lower soil layers 1 correct; 2 correct; 3 correct; 5 correct;	**4**

Question	Answer	Marks
4(a)	*clockwise in order:* 78%: nitrogen; 21%: oxygen;	**2**
4(b)	*two from:* argon; carbon dioxide; water (vapour);	**2**

Question	Answer	Marks
5(a)(i)	$4200;	**1**
5(a)(ii)	**M1** 200 000 000 – 110 **OR** 199 999 890; **M2** (M1 ÷ 110 × 100 =) 1.8×10^8(%);	**2**
5(b)(i)	kills non-target species; bioaccumulation / described (build up of toxin within an organism);	**1**
5(b)(ii)	creates a sense of danger / birds perceive threat / scares birds away;	**1**
5(b)(iii)	fly into engines / blocks (the pilot's) vision;	**1**
5(c)	primary consumer because it, feeds at second trophic level / eats producers / eats tomatoes; secondary consumer because it, feeds at third trophic level / eats primary consumers; / eats earthworms;	**2**

Question	Answer	Marks
6(a)(i)	30.1(%);	**1**
6(a)(ii)	atmosphere;	**1**
6(a)(iii)	*any two from:* decrease in ice sheets and glaciers due to melting; increase (in ground)water due to, ice sheets / permafrost, melting; increase in atmosphere content due to evaporation of, surface water / groundwater; decrease in (ground)water / water levels in rivers / lakes due to evaporation at the surface; increase in sea levels as ice sheets / glaciers melt ;	**2**
6(b)	glucose + oxygen; → carbon dioxide + water;	**2**

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Question	Answer	Marks
6(c)	*any five from:* spread of / increase in water borne disease / illness; named bacterial disease, e.g. typhoid, cholera; loss of earnings / too ill to work / loss of time (to do other things); loss of human life; lower life expectancy; maintains poverty/ lower living standards / conditions; places demands on government (to improve sanitation); AVP;	**5**

Question	Answer	Marks
7(a)(i)	*any two from:* longer growing season in South / shorter growing season in North; specific area described; longer growing season near lakes;	**2**
7(a)(ii)	*any three from:* temperature; amount / availability of water / rainfall; amount of sun / light; terrain / elevation; effect of lake on local climate;	**3**
7(b)(i)	*any two from:* greenhouse gas; heat / infra-red radiation emitted from the Earth is trapped by greenhouse gases in the atmosphere contributes to, global warming / (enhanced) greenhouse effect;	**2**

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Question	Answer	Marks
7(b)(ii)	*any two from:* farming for a profit / produce sold; large scale; mechanised / use of technology; very few workers;	**2**
7(c)	*any two from:* wind break; shelter / shade for, livestock / crops; roots binds soil; prevents wind / soil erosion; provides habitat; for, pollinators / beneficial insects; increases biodiversity; provides corridor for wildlife; dead leaves provide organic matter;	**2**
7(d)	*any four from:* water / rain, easily available / specialist expertise not required; sustainable; free from chemicals that may be in, groundwater / surface water; reduces use of, groundwater / water in aquifers / other sources; may reduce, floods/waterlogging / soil erosion / impacts of drought; saves money / free; money saved can be used for another named purpose, e.g. education, buying seeds; suitable for trickle drip irrigation;	**4**

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Question	Answer	Marks
8(a)	*narrow top:* low proportion of people live into old age / high death rate; *wide base:* large number of children / high birth rate; *percentage of females compared to males in the 75+ age group:* women live longer than men;	**3**
8(b)	base narrower than middle AND male and female approximately equal;	**1**
8(c)(i)	availability of family planning / education;	**1**
8(c)(ii)	*any one from:* no funding for projects; the UNPF will not fulfil its aim; increased (unwanted) pregnancies; more deaths in childbirth; example of how young persons' potential in not fulfilled;	**1**
8(d)(i)	*Any two from;* general trend of overall increase (in population)(between 1962 and 2017); net migration fluctuates; correct use of data;	**2**
8(d)(ii)	*any three from:* economic / jobs; education; social ties / closer to family; escape from, political persecution / war / ethnic or religious intolerance or persecution; environmental / natural hazards / drought; food or water insecurity ;	**3**

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Question	Answer	Marks
9(a)(i)	dashed line arrow = cold current solid line arrow = warm current correct symbols that match the diagram; symbols match correct current;	**2**
9(a)(ii)	circular / anticlockwise;	**1**
9(b)(i)	bar to 5 tonnes, same width as existing bars;	**1**
9(b)(ii)	37.5 (tonnes); (7 ÷ 10 × 37.5 =) 26.25;	**2**
9(c)	*any three from:* chemicals / salt / minerals; building materials; wave / tidal, energy; tourism; transport; desalination (for drinking water);	**3**

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Question	Answer	Marks
9(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] *indicative content discussion of:* The oceans are too polluted to be a source of safe food. *agree:* many types of pollution, e.g. plastic, oil, sewage, chemical description of how pollution gets into the sea, e.g. leaching, illegal dumping, poor waste disposal effects of pollution, e.g. eutrophication, bioaccumulation, food chains and food web destruction, reduction of marine populations (even) fish farming can pollute currents carry pollution all round world increasing population means we must use ocean as resource overfishing	**6**

Question	Answer	Marks
9(d)	*do not agree:* most fish / sources of food are not (yet) polluted many different types of food source in oceans oceans are very large pollution often localised / coastal (rather than worldwide) current fisheries industry is strong in many countries it is possible to maintain fishing sustainably using close seasons, net design etc. fish farming where water quality can be controlled and monitored international treaties to reduce waste disposal into ocean, improvement in legislation public awareness of single use plastics	

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