Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/23**

Paper 2 Management in Context **May/June 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.

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This document consists of **11** printed pages.

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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)(i)	*any three from:* (tectonic) plates move / at plate boundaries; pressure of magma; Earth's crust is thin; magma rises ; comes out / breaks through the, crust / cracks / vents; (as) molten lava / ash ;	**3**
1(a)(ii)	basalt;	**1**
1(a)(iii)	*any two from:* erosion; erosion by (sea) water / wind; sea level rise;	**2**
1(b)(i)	a large wave ;	**1**
1(b)(ii)	Richter / Moment Magnitude (scale);	**1**
1(b)(iii)	*any two from:* earthquakes are only low on the scale / between 1.5–2.7; valid comment about magnitude needed to increase the risk / eq; AVP; e.g. terraces reduce risk of landslide	**2**
1(b)(iv)	*any three from:* flooding; death / injury; from drowning / rocks falling; evacuation; damage to buildings; damage to agriculture, e.g. crops, farmland, livestock; damage to infrastructure, e.g. communications, transport networks; loss of jobs / damage to the economy ; AVP's;; e.g. cholera / typhoid / water borne disease *OR* loss of biodiversity	**3**

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Question	Answer	Marks
1(b)(v)	*any three from:* monitoring stations; warning systems; evacuation (plan); (evacuation) drills; (emergency) rescue teams; (emergency) shelters; stores of food and water; medical aid ; AVP e.g. build seawalls / only build on high ground	**3**

Question	Answer	Marks
2(a)(i)	Lanzarote;	**1**
2(a)(ii)	nitrogen / nitrate / potassium;	**1**
2(a)(iii)	2248 (km^2);	**1**
2(b)(i)	*any two from:* light (intensity); (volume / frequency, of) water added; temperature; spacing of seeds in tray; same size of tray; pH (of soil); (volume / mass / type, of) soil;	**2**
2(b)(ii)	as a control experiment / for comparison;	**1**
2(b)(iii)	both axes labelled; sensible linear scales such that data covers at least half the grid; correct plots tray B; correct plots tray C; plots joined point-to-point with a **straight** line AND both graph lines labelled; **do not allow any lines crossing between plots**	**5**

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Question	Answer	Marks
2(b)(iv)	C has a steeper gradient / faster (rate of) growth than B; C reaches the maximum first / at 27 days whereas B is at 30 days;	2
2(b)(v)	the plants grow faster when volcanic ash is added;	**1**
2(b)(vi)	repeat the experiment using other plant species / use more values of mass for the ash / more plants / AVP;	**1**
2(c)(i)	850 (cm);	**1**
2(c)(ii)	one wall that is not parallel to wind direction; use of the wall symbol from the key;	**2**
2(d)(i)	(the larvae / beetle) eats the producer / plants;	**1**
2(d)(ii)	4;	**1**
2(d)(iii)	it is not used on the farm / it is sold (for money);	**1**
2(d)(iv)	*any two from:* it can continue for a long time / multi-generational / beetles can reproduce; no degrading of soil / eq; no use of, fertilisers / pesticides; AVP; e.g. beetle dung is a fertiliser	**2**
2(e)(i)	*any three from:* terraced fields; trees / vegetation hold soil / prevent erosion; prevent soil erosion; maintain fertility; irrigation used; by gravity / without need for pumps / using bunds / walls; bunds / walls used; prevent (wind) erosion / help, shelter trees / vegetation;	**3**
2(e)(ii)	sand ; silt;	**2**

Question	Answer	Marks
2(e)(iii)	*any three from:* reduces (oxygen concentration in) air spaces; roots cannot respire; kills (roots of) crops / drowns crops; causes plants to become shallow-rooted; causing salinization; and compacts soil; reduces crop yields; soil is washed away; minerals are lost from the soil; decreases fertility; kills worms and other organisms in soil; AVP; e.g. roots cannot take up minerals / nutrients	**3**

Question	Answer	Marks
3(a)(i)	*any three from:* housing / businesses / shops / named example; recreational; roads; small fields / agricultural; forest / wild / conservation areas;	**3**
3(a)(ii)	*any two from:* many steep slopes / mountainous; without soil / infertile; machinery cannot be used; infertile soil / no soil to anchor roots; most suitable land already used / named example of use; AVP;	**2**

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Question	Answer	Marks
3(a)(iii)	*any one from:* (fossil) fuel; building materials; manufactured goods, e.g. cars; medical supplies; AVP;	**1**
3(b)(i)	*any two from:* to find out people's views on building; to survey the wildlife; will lose habitat; check no endangered species to protect local activities such as farming; AVP; e.g. safety comment	**2**
3(b)(ii)	*any two from:* no carbon emissions / GHG's / does not contribute to global warming; no acid rain gases; reduces need to import, fossil fuels / oil; readily available / lots of wind on islands;	**2**
3(b)(iii)	*any two from:* solar; wave; tidal; geothermal; hydro power / HEP; biomass;	**2**
3(c)(i)	Gran Canaria 850 Lanzarote 151 Fuenteventura 117 La Palma 82 El Heirro 11 arranged highest to lowest in correct order; all numbers correct;	**2**

Question	Answer	Marks
3(c)(ii)	15.25 (million);	**1**
3(d)(i)	yes-no question about tourist tax, e.g. should the tourist tax be used to fund environmental projects?;	**1**
3(d)(ii)	to make sure a wide range of tourists is surveyed;	**1**
3(d)(iii)	random or systematic specified; correct description matching method specified, e.g. use a random number generator, ask every fifth tourist;	**2**
3(d)(iv)	*any two from:* to see if their opinions have changed; to decide when to charge the tourist tax; to check if the findings are similar to the sample of people arriving at the airport; AVP; e.g. tourist more / less willing to pay the tax	**2**
3(d)(v)	(5.89 × 9 =) 53.01 (million euros);	**1**
3(d)(vi)	*any four from:* developing sewage treatment; offsetting carbon emissions; encouraging ecotourism; using renewable energy resources; recycling waste caused by tourism, e.g. plastic bottles / litter collection; educating, local people / tourists; employing environmental guides / wardens; funding to maintain natural beauty areas, e.g. forest, beaches; (create a) national park / nature reserve / eq; AVP; e.g. bikes / electric cars / laws against littering / prevent hunting;	**4**

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Question	Answer	Marks
3(e)	*any five from: allow a mixed answer or one point of view* *Yes* transport, e.g. planes and cars; (combustion of fossil fuel) produces CO2 / GHG's; construction of materials for hotels, e.g. cement; more energy / electricity (used on luxury items, e.g. swimming pools, saunas); land is cleared for buildings; fewer, trees / plants; so less photosynthesis / eq; e.g. less carbon dioxide absorbed destruction of carbon stores / sinks; (intensive) farming practices to supply food for tourists; increased methane from cattle; AVP; e.g. burning more fossil fuels *No* tourists would release similar amounts of C in their own country; if they have enough money they will consume goods that may have contributed to climate change in their manufacture anyway; AVP;	**5**
3(f)	*any two effects of climate change linked to small island context:* (small) **sea**-level rise / extreme weather / hurricanes limited land available so effects of climate change more pronounced; causing flooding (of coastal plains); loss of homes; forced migration; loss of farmland; contamination of fresh water sources; must move inland (near volcanoes);	**2**

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