Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **October/November 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 October/November 2023 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	‘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.

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)	14.2 × 0.11 **or** 1.562; 1.6;	**2**
1(b)(i)	–36.7 **AND** –6.6; 30.1;	**2**
1(b)(ii)	axes labelled with unit: x-axis (month and) Oct Nov Dec Jan Feb **and** y-axis (average) temperature **and** °C; sensible linear scale such that the data occupies half the grid area; data plotted correctly for Oct to Feb; plots connected with line or smooth curve;	**4**
1(b)(iii)	*any four from:* lack of sunlight; (extreme) cold; no, rain / precipitation; water trapped as ice / no available water; prevents photosynthesis; built on ice / no soil / ground frozen;	**4**
1(c)(i)	*any four from:* easily moved; height above ice can be increased; legs can be removed / stops it getting buried / stops legs getting stuck / reduces land pollution; increases surface area / stops sinking; idea of durability or strength of metal;	**4**
1(c)(ii)	*any two from:* cold temperatures / keep people warm; reducing energy use or energy resources / increased efficiency ; all energy resources must be brought in; (in cold) machinery stops working;	**2**

Question	Answer	Marks
1(d)(i)	*any two from large amounts are:* costly to remove; difficult to store / reduces quantity to store; difficult to transport; less energy needed to remove the waste; prevents, visual /smell / water / atmospheric pollution;	**2**
1(d)(ii)	*any one from:* large amounts / difficult to transport / long distance to transport; idea that transportation increases risk of disease or water pollution; smell;	**1**
1(e)(i)	oxygen;	**1**
1(e)(ii)	carbon dioxide / gas (is produced);	**1**
1(e)(iii)	*any three from:* humidity / water; oxygen; salinity; light; pH;	**3**
1(e)(iv)	*any one from:* carbon dioxide / greenhouse gases, released; global warming / climate change; smell;	**1**
1(e)(v)	*any one from:* increases soil fertility / adds, nutrients or organic matter, to soil; (organic) fertiliser; increases crop yield;	**1**

Question	Answer	Marks
1(e)(vi)	*any two from:* geothermal; hydro(electric) / HEP; tidal; wave; solar; wind;	**2**

Question	Answer	Marks
2(a)(i)	*any two from:* competition / outcompeting (native species); no natural predator; predators (to native species) / endanger populations (of native species); idea of **ease** of predation, e.g. eat nesting birds as no groundcover;	**2**
2(a)(ii)	*any one from:* can kill non-target species / other species eat rat poison; poison can enter water sources;	**1**
2(b)(i)	*any one from rats in small boats:* can't hide; easier to see; easier to remove;	**1**

Question	Answer	Marks
2(b)(ii)	*overall max three:* *max two for dogs method 1:* only walked part of the island / 3 dogs can't cover all island; dogs might miss a rat / can't smell them over a long distance / rats move around; dogs can only work for a limited period of time; cold weather conditions for dogs; *max two for chew sticks method 2:* costly, as thousands needed; time consuming / need to be inspected for chew marks other animals might chew them / difficult to interpret type of chew marks; rats may not use chew stick / chew stick not in area where rats are; same rat may have chewed on different sticks; chew sticks might get buried (by snow);	**3**
2(c)	*any three from in New Zealand:* larger area of land / more islands; people live there; trees / ground cover (for rats to hide); people may protest / concern over harm to people; more food sources; more people or ships arriving or leaving;	**3**
2(d)	boiling; chlorination;	**2**

Question	Answer	Marks
3(a)	*any two from:* fished at a greater rate than population can recover; eventually stocks run out / fish unavailable for future generations; young fish are caught / reproduction cannot occur;	**2**
3(b)(i)	104 000;	**1**

Question	Answer	Marks
3(b)(ii)	*any three from:* difficult to patrol or monitor (fishing boats as ocean is large); worth a lot of money; so fishermen do not want to throw back; easily caught in nets / easily caught as bycatch;	**3**
3(b)(iii)	*any three from:* use smaller nets; use larger mesh size; limit size of boats; quotas / limit number of boats / licences; closed seasons; protected areas / reserves / no fish zones; laws / international agreements / legislation; monitoring / patrols; fines / enforcement;	**3**
3(c)(i)	*any one from:* (fish) population decrease **and** fewer **squid** or less food to eat; no effect **and** find a different food source;	**1**
3(c)(ii)	*any two from:* water too warm; change in ocean circulation; change in predators; change in availability of, food / phytoplankton / nutrients;	**2**

Question	Answer	Marks
4(a)(i)	*any one from:* individual years can be identified; each slice represents a different time period;	**1**

Question	Answer	Marks
4(a)(ii)	*any one from:* idea that we know when the volcano occurred, so we know the age of the layer which contains ash; chemical evidence of the volcanic eruption (in the ice);	**1**
4(b)(i)	increasing (CO_2 concentration over time); at faster rate / steeper gradient (in recent years);	**2**
4(b)(ii)	*any two from:* (use or combustion of) fossil fuels increased; increased population; increased, industrialisation / urbanisation / use of vehicles; deforestation;	**2**
4(b)(iii)	*any two from:* methane; water (vapour); AVP;;	**2**
4(b)(iv)	melting, ice / ice sheets / glaciers / permafrost; **water** in the seas is warming (due to atmospheric warming); *causing:* volume of water in seas or oceans expands;	**3**
4(c)(i)	CFC(s) / chlorofluorocarbons;	**1**
4(c)(ii)	stratosphere;	**1**
4(c)(iii)	higher levels of, UV / ultraviolet radiation (reach Earth); *causing any two from:* skin cancer; cataracts; damage to vegetation;	**3**

Question	Answer	Marks
5(a)(i)	51 707 – 43 915 **or** 7792; 17.7(43) / 18;	**2**
5(a)(ii)	*any two from:* prevents tourists feeding animals / touching animals / making noises / dropping litter / less waste; prevents disturbance of, breeding / feeding; educate the tourists about Antarctica;	**2**
5(b)(i)	*idea that:* outer / first, hull damaged; inner / second, hull prevents the oil entering the ocean;	**2**
5(b)(ii)	boom / detergent (sprays) / skimmers;	**1**
5(c)	*any three from:* oil coats fur / skin; destroys insulating ability of fur; leads to hypothermia; oil ingested / taken in during feeding or when cleaning; toxic; bioaccumulation; oil inhaled / suffocation; oil gets in eyes; reduction in food;	**3**