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Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **February/March 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 February/March 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.

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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	<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.

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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 two from:* highest population, N(E) / commercial area / port / capital / Nassau; lower population, either end of island / E and W / agricultural area / protected forest;	**2**
1(a)(ii)	*any two from:* *highest population:* more jobs / earn money; better, infrastructure / services / shops / schools / hospitals / transport; *lower population:* housing not allowed in the, protected forest / agricultural land;	**2**
1(b)	272 637;	**1**
1(c)(i)	*any three from* percentage of population: increases from 0–24 **or** 24–29; decreases from 25 or 50 ; rapidly decreases from 60 / no one after 89 or 94; very similar for males and females; AVP;;	**3**
1(c)(ii)	*any three from:* conflict / refugees; economic; employment; family; M5 favourable climate; health care / hospitals; education / schools;	**3**
1(d)(i)	aquifer;	**1**

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Question	Answer	Marks
1(d)(ii)	*any two from:* reservoirs; lakes; rain water (harvesting); desalination (plants);	**2**
1(d)(iii)	*any four from (max three from each):* *benefits:* simple technology; M2 easy (to transport); water can be pre-treated; AVP; *limitations:* weather dependent; risk of contamination; uses (fossil) fuels / energy required for transport; transport is slow; limited number of barges / idea of disrupted supply of barge out of service; AVP;	**4**

Question	Answer	Marks
2(a)(i)	phytoplankton → shrimp → flamingo → vulture 4 organisms in correct order; arrows in correct direction;	**2**
2(a)(ii)	*any four from:* (chlorophyll) in, producer / phytoplankton; needed for photosynthesis; uses carbon dioxide and water; uses (Sun) light (energy); to produce, glucose / sugar / (store) <u>chemical</u> energy; energy moves (along food chain);	**4**

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Question	Answer	Marks
2(b)(i)	*any four from:* preserve habitat; *introduce:* national parks; captive breeding / zoos ; wildlife, wardens / guides; laws to give them protected status; *control:* disturbance by people / limit numbers of tourists; predators e.g. vultures; shrimp fishing; hunting / fines for illegal poaching; AVP;	**4**
2(b)(ii)	*any five from:* described method of dividing island or lake; random / systematic sampling or method described; count the number of flamingos; at a set time or date; record results, in a table / using a tally system; idea of scaling up to whole area; repeat **and** average;	**5**
2(c)(i)	salinity increases as rainfall decreases / ora; *idea of:* lag period between change / change is slow; rainwater dilutes salt in lake; *relevant data:* salinity highest in March **and** rainfall lowest in Oct;	**3**
2(c)(ii)	the higher the temperature, the greater the evaporation of water; (as water evaporates) the salinity or concentration increases;	**2**

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Question	Answer	Marks
3(a)	*any three from:* jobs; personal economic reason; national economic reason e.g. increase GDP; can be export; creates infrastructure; processed product in more demand;	**3**
3(b)(i)	*any three from:* millions of years ago; (remains of small) animals / plants / organisms AND deposited on sea floor; covered with, sand / mud / sediment (to form rock); heat **AND** pressure (converted to crude oil);	**3**
3(b)(ii)	coal / gas;	**1**
3(c)	*any three from:* (oil) combusted / burnt; heat is used, to boil water / produces steam; steam, turns / drives / moves / runs, a turbine; turbine, turns / drives / moves / runs, a generator;	**3**
3(d)(i)	*any two from leaks or spills from:* pipelines; shipping at sea; cleaning tanks at sea; oil processing plant; (offshore) oil extraction / oil rigs;	**2**

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Question	Answer	Marks
3(d)(ii)	*any four from:* oil covers coral / organisms; oil is toxic; oil stops, light from getting to coral / photosynthesis; oil stops corals from filter feeding; no food for consumers; no nursery area for breeding organisms; disrupts food web / food chains / biodiversity;	**4**
3(d)(iii)	*any three from:* MARPOL; double hull tankers; booms; detergents; skimmers; burning;	**3**
3(e)(i)	question 3 has incomplete data / only 19 responses / should be 20 responses;	**1**
3(e)(ii)	*any two from:* *disagree people are concerned because:* data too close / difference in data is not significant; sample, size too small / may not be representative; questions are all, closed / yes-no; error made so data not reliable; *agree people are not concerned because:* more people answered 'no', to question 2 / are you worried;	**2**

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Question	Answer	Marks
3(e)(iii)	*any three from:* more questions; ask open questions; larger sample size / ask more people / make sample more representative; ensure participants are residents / make sure tourists are not surveyed; survey equal numbers of, different age groups / males and females; repeat on different days; repeat in different locations;	**3**

Question	Answer	Marks
4(a)	*any two strategies:* limit size of lobster you can harvest / only catch larger lobsters; protect female lobsters (with eggs); quotas; closed seasons; protected areas and reserves; conservation laws, e.g. licences for harvesting; monitor and enforce; *any two explanations that fit the strategies:* allows immature lobster to reach breeding age; females produce massive amounts of eggs / one male can fertilise eggs from many females; prevents overfishing; allows lobster to breed; allows larvae to spread from protected area; limits the number of, fishermen / fishing days / boats; ensure people are following the rules;	**4**
4(b)(i)	238;	**1**
4(b)(ii)	615 or area 2 is, anomalous / not consistent with the other data;	**1**

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Question	Answer	Marks
4(b)(iii)	*y*-axis labelled with unit: **mean** number of lionfish per hectare **and** *x*-axis labelled year and years identified; linear scale such that bars occupy more than half the grid; all bars plotted correctly; bars of equal width;	**4**
4(b)(iv)	*any two from:* limited, food supply / spiny lobster; reached carrying capacity; disease; control methods introduced e.g. hunted; AVP;	**2**
4(c)	*any five from (max four from one section):* *benefits:* biological control; sharks prey regularly on lionfish / no further training needed; only lionfish killed / no bycatch; job / income, opportunity; AVP;; *limitations:* requires divers to train sharks; could be dangerous for the diver; training sharks is difficult; expensive; labour intensive / time-consuming; population of lionfish is too high / lionfish can reproduce too quickly; lionfish spread over too large of an area; AVP;;	**5**

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