CAMBRIDGE
International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/23**

Paper 2 Management in Context **May/June 2024**

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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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 descriptions 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 one from:* M1 low birth rate ; M2 high life expectancy ; M3 low children per woman ;	**1**
1(a)(ii)	*any three from* M1 similar shape / width for males and females ; M2 narrow base ; M3 wider in the middle ; M4 tall / high ;	**3**
1(a)(iii)	1 275 000 ;	**1**
1(a)(iv)	75 ;	**1**
1(b)	*any three from:* M1 soil is fertile ; M2 soil erosion avoided ; M3 different crops need different nutrients / minerals / named ions ; M4 reduces risk of pests / disease ; M5 reduced use of pesticides / fertilisers ; M6 some crops / legumes add nutrients / minerals / mineral ions ;	**3**
1(c)	631 ;	**1**
1(d)(i)	*any three from* M1 high / increased temperatures / global warming / (enhanced) greenhouse effect ; M2 (high temperatures increases) evaporation / less surface water ; M3 dry soils / land ; M4 no / less rain / ppt ; M5 (global warming) alters weather patterns ; M6 more chances of extreme weather ;	**3**
1(d)(ii)	*any two from:* M1 cracks in soil ; M2 no / few plants ; M3 no water (visible) / dry soil / land;	**2**

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Question	Answer	Marks
1(d)(iii)	*any three from* M1 rainwater harvesting ; M2 irrigation /described ; M3 drought tolerant / resistant crops ; M4 dams and reservoirs (on farm) ;	**3**
1(e)(i)	M1 the movement of pollen from an anther to a stigma ; M2 animal / insect / named insect pollination / wind pollination ;	**2**
1(e)(ii)	*any two from*: M1 nitrate ; M2 potassium ; M3 phosphate ;	**2**
1(f)	M1 precipitation ; M2 infiltration ; M3 ground water (flow) ;	**3**
1(g)	*any three from*: M1 do not use on rainy / windy days; M2 control/use less fertiliser/follow instructions e.g. use correct quantity; M3 keep animals / animal waste out of / organic matter/away from rivers; M4 ensure plant cover / no bare soil; M5 plant trees / shrubs, around edges of field / near rivers / *idea of* a buffer at edge of field; M6 contour ploughing / terracing / use of bund; M7 direct drilling ;	**3**

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Question	Answer	Marks
2(a)(i)	75 (mm) ;	**1**
2(b)(i)	*any two from* M1 they produce their own glucose; M2 use process of photosynthesis / trap sunlight / convert light energy; M3 first trophic level;	**2**
2(b)(ii)	small fish ;	**1**
2(b)(iii)	(direction) of energy transfer / flow / nutrient / food flow / feeding;	**1**
2(b)(iv)	food chain only shows one feeding relationship / food webs show alternative sources of food for organisms or consumers / food web is more than one food chain;	**1**
2(c)(i)	17 **AND** 5 ;	**1**
2(c)(ii)	*any one from:* M1 catch are fluctuating and not decreasing; M2 does not exceed TACC / 30 tonnes ; M3 catch recovers (from a lowest point or three times) / always between 5 and 17 tonnes; M4 if it was not sustainable the catch would not recover ;	**1**
2(c)(iii)	(lowest quota so) most likely to prevent overfishing / extinction / collapse of fish population / fish stock;	**1**
2(d)	*any three from* M1 use smaller nets; M2 use larger mesh size; M3 limit size of boats; M4 limit number of boats / licences; M5 closed seasons; M6 protected areas / reserves / no fish zones; M7 laws / international agreements / legislation/regulations/fines/enforcement ; M8 monitoring fishing / patrols;	**3**

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Question	Answer	Marks
2(e)(i)	**M1** axes labelled with unit: x-axis year **AND** y-axis mass (of salmon exported) **AND** thousand tonnes **M2** sensible linear scale such that the data occupies half the grid area; **M3** data plotted correctly; **M4** bars of equal width;	**4**
2(e)(ii)	M1 4.6 – 3.8 or 0.8 ; M2 (M1 ÷ 3.8 × 100) = 21 % ;	**2**
2(e)(iii)	*any one from:* M1 conditions no longer ideal for reproduction / growth / survival ; M2 reduced feeding by salmon ; M3 they grow better in cold water / slower in hot ; M4 more disease ; M5 stress ; M6 (some) died;	**1**
2(f)(i)	*any three from* M1 (increased) greenhouse gases **OR** named greenhouse gas ; M2 (solar) radiation / sunlight passes through the Earth's atmosphere ; M3 (some solar) radiation is lost to space; M4 (some solar) radiation is reflected back to the Earth's surface ; M5 (solar) radiation is absorbed by the oceans;	**3**
2(g)	*any three from* M1 (fish / food) wastes / eutrophication; M2 chemical pollution from boats ; M3 use of pesticides; M4 (escaped fish) disrupt food chain / spread of disease (to wild fish stocks); M5 reduction of overfishing; M6 economic impact described; M7 damage to (wild) fish stocks used as food for salmon;	**3**

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Question	Answer	Marks
3(a)(i)	surface mining / open pit / opencast ;	**1**
3(a)(ii)	falling rocks / rockfall / landslides;	**1**
3(a)(iii)	sedimentary ; metamorphic ;	**2**
3(a)(iv)	*any three from* M1 micro-organisms; M2 air; M3 water ; M4 organic matter / humus;	**3**
3(b)(i)	control / to compare the growth of plants;	**1**
3(b)(ii)	*any three from* M1 **volume / mass** of soil / waste ; M2 **volume** of water ; M3 **volume** / size of pot ; M4 temperature ; M5 light (intensity) / daylength; M6 humidity;	**3**
3(b)(iii)	*any two from* M1 plants in waste rock are shorter / stunted ; M2 plants in waste rock **do not** flower ;	**2**
3(b)(iv)	*any three from* M1 identify / find a plant that is resistant (to insects) ; M2 identify / extract gene(s) for resistance (to insects); M3 insert / introduce gene(s) into grass plants ;	**3**

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Question	Answer	Marks
3(c)(i)	*any four from* M1 add microbes / bacteria / fungi / microorganisms ; M2 add organic matter ; M3 add soil; M4 plant seeds/vegetation/trees ; M5 introduce (grazing) animals ;	**4**
3(c)(ii)	*any two from* M1 reduces human interference / stated example eg hunting ; M2 creates / maintains many habitats ; M3 increases / maintains biodiversity ; M4 protects (rare / endangered) species;	**2**
3(d)	*any two from:* M1 fluctuates ; M2 then decrease ; M3 overall decrease ;	**2**
3(e)	*any three from* M1 (risk of) water / land / soil / air / noise / visual pollution ; M2 loss of, habitat / biodiversity / wildlife ; M3 need to relocate people ; M4 scare animals away ; M5 damage due to transport ; M6 loss of farm land ;	**3**

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