CAMBRIDGE
International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **October/November 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)	0.44;	**1**
1(b)	*any two from:* cotton planted instead of food or (food) crops / cotton cannot be eaten; cotton grown for, commercial value / profit / money or cotton is a cash crop / cotton makes more money (than other crops); not enough money to grow (food) or (food) crops as money spent on cotton; **stated impact** on soil due to cotton farming e.g. nutrient depletion risk of disease from cotton crop to food crops; cotton growing uses lots of water that cannot be used to irrigate food crops;	**2**
1(c)(i)	Sun;	**1**
1(c)(ii)	chlorophyll;	**1**
1(c)(iii)	carbon dioxide + water → glucose + oxygen reactants: carbon dioxide + water; products: glucose + oxygen;	**2**
1(c)(iv)	producer;	**1**

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Question	Answer	Marks
1(d)	*total four from:* *max three advantages:* continuous (operation); automated / less people needed; reliable; increases yields; quicker / more efficient; *max three disadvantages:* loss of jobs; expensive to buy or set up or run; need to be maintained or cost of maintenance; need technological skills; less accurate / not selective crop / may miss some crops; can damage crop; requires, energy source / fuel; stated impact of using fossil fuel e.g. global warming	**4**
1(e)(i)	3;	**1**
1(e)(ii)	*any three from:* more demand / (higher) population density; more, hard surfaces / roads or less trees; less water soaks into ground / increased runoff; less interception / less infiltration; increased, wastage / leaking pipes;	**3**
1(f)	*any two from:* time consuming / time could be used for other things; labour intensive; might miss some bollworms / difficult to see; crop could be damaged; idea of larvae produced quicker than people can remove them;	**2**
1(g)(i)	control / compare the effect with no insecticide;	**1**

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Question	Answer	Marks
1(g)(ii)	330;	**1**
1(g)(iii)	329;	**1**
1(g)(iv)	*any one from:* due to the insecticide / other variables e.g. water quantity; anomalous result; investigation has not been repeated;	**1**
1(g)(v)	*nitrogen*: NO_3^- ; *phosphorus*: PO_4^{3-} ; *potassium*: K^+ ;	**3**
1(g)(vi)	*any two from:* air; organic material / decaying matter; plants; animals; microorganisms; water;	**2**
1(g)(vii)	*any two from:* works as well as an insecticide / (field **D** had a) high yield; no leaching; no bioaccumulation; no resistance (to an insecticide); allows crops to be sold as organic; less impact on non-target organisms / does not affect pollinators;	**2**

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Question	Answer	Marks
1(g)(viii)	*any one from:* increase yields; (can be made) resistant to insects / drought tolerant; improved nutrient content;	**1**
1(h)(i)	*any three from:* washed into water sources; ingested by, animals / humans; bioaccumulation / microplastics build-up in an organism; non-biodegradable / decomposition takes a long time; detergents washed into water sources; stated impact of detergents e.g. nutrient enrichment / eutrophication;	**3**
1(h)(ii)	*any two from:* crude oil / fossil fuels, are non-renewable or finite; stated impact of fossil fuel combustion e.g. carbon dioxide emissions / global warming; AVP;;	**2**

Question	Answer	Marks
2(a)(i)	24;	**1**
2(a)(ii)	*any three from:* magnitude / Richter scale value; location; population / population density; number of deaths; number of injuries; date of earthquake; time of earthquake; damage caused to, buildings / infrastructure / homes / schools / businesses; loss of jobs stated management strategy e.g. number of earthquake reinforced buildings / evacuation plans;	**3**

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Question	Answer	Marks
2(b)	*any one from:* allows for evacuation / gives time to escape / (advanced) warnings;	**1**
2(c)(i)	12;	**1**
2(c)(ii)	*any one from:* impacts more than one country; (international) flights / air space impacted; no atmospheric boundaries;	**1**
2(d)	giant wave;	**1**
2(e)	6 consecutive in correct order = 3 3–5 consecutive in correct order = 2 2 consecutive in correct order = 1 A, E, F, G, D, B ;;;	**3**
2(f)	*any two from:* (size of) population; personal wealth / poverty; national wealth; climate / weather; (availability of) supply; cost of electricity; level of industrialisation or development; amount of transport;	**2**
2(g)(i)	(natural) gas / methane;	**1**
2(g)(ii)	sedimentary / shale;	**1**
2(g)(iii)	*any one from:* risk of earthquakes; contamination of (underground) water or soil; use of (toxic) chemicals; leads to water insecurity / large quantities of water used;	**1**

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Question	Answer	Marks
3(a)	*any two from:* rings getting closer together (towards the bark / nearer outside); drier weather in recent years / climate changed as tree grows;	**2**
3(b)(i)	[(527 000 – 9300) ÷ 9300] × 100 OR 5566.67; 5567;	**2**
3(b)(ii)	heat wave / high temperatures / more extreme weather / lack of rainfall;	**1**
3(b)(iii)	sectors in clockwise rank order; largest sector first starting at 'noon' and going clockwise; correct plotting; key competed and matches sector shading;	**4**
3(b)(iv)	*any three from:* rebuild cost of homes / homes destroyed; rebuild cost of infrastructure / infrastructure destroyed / clean up costs; businesses destroyed / cannot produce goods; people cannot work / loss of income; crops cannot be sold / food needs to be bought / increase in price of food; less tourism; less wood for fuel / need to buy wood; stated healthcare cost due to wildfires;	**3**
3(c)	July AND August;	**1**
3(d)(i)	*any two from:* fluctuates each year; similar pattern (over the 20 year; overall increase in (mean temperature); relevant quoted data to show: highest temperature at end of 2021 / lowest temperature. in 2003 °;	**2**

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Question	Answer	Marks
3(d)(ii)	*any two from:* limited number of years / limited time interval; only from one country; secondary source / do not know (original or primary) source; no information on how the data was collected; AVP;;	**2**
3(d)(iii)	*any two from:* surrounded by water / coastal; increased risk of flooding due to, sea level rise or melting glaciers; harder to get drinking water to an island; harder to import food if crops destroyed / less supply of fish so less jobs;	**2**

Question	Answer	Marks
4(a)	*max three total:* *max two from:* reacts with water (in atmosphere); leads to, acid rain / sulfuric acid; *max two from acid rain causes:* acidification of bodies of water or soil; reduces fish populations; destroys crops or vegetation; damages buildings; respiratory problems; eye irritant;	**3**
4(b)(i)	layer in atmosphere where air temperature increases with height or altitude;	**1**
4(b)(ii)	traps pollution (under inversion);	**1**

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Question	Answer	Marks
4(c)(i)	*any three from:* location is in or near a, town / city; greater number of people; **emissions from** vehicles or factories or cars / burning of fossil fuels; waste incineration; crop burning / wildfires; no legislation on emissions; volcanic eruption;	**3**
4(c)(ii)	*any two from NO:* only 6 monitoring stations / not enough data; air quality not measured all over Greece / data not representative; air quality only measured on one day; not all stations recorded good air quality / only 1 station recorded good quality;	**2**

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