Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **October/November 2021**

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 2021 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	‘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 two from:* increasing; no fluctuations / increased gradually; increased by 11% / increased from 68% to 79%;	**2**
1(a)(ii)	6.8;	**1**
1(a)(iii)	*any two from:* better employment / economic opportunities; better access to services/infrastructure; education; healthcare; clean water / sanitation; electricity; transport; improved security; less chance of natural disasters, e.g. volcanic activity; AVP;	**2**
1(a)(iv)	*any two from:* fewer people to do jobs / loss of jobs; change the traditional way of life / loss of cultural identity; negative impact on economy; increased waste; loss of land / loss of homes; reduced production of food / less farms / less farming; AVP;	**2**

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Question	Answer	Marks
1(a)(v)	*any two reasons and any two explanations that link to the reason:* education; people know how to lead a healthy life / are able to get better jobs / earn more money; healthcare; illnesses can be cured or prevented or treated / access to vaccines / access to medicines or doctors / access to family planning; clean water or sanitation; less chance of, drinking contaminated water / catching a water-related disease, e.g. cholera or typhoid; electricity; temperature control / refrigeration; AVP;	**4**
1(b)(i)	*from* May *to* Dec;	**1**
1(b)(ii)	400 – 85; 315 ;	**2**

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Question	Answer	Marks
1(b)(iii)	*max two use of data from:* hot (all year); wet (all year); relevant quoted data, e.g. 26.2 max to 23.9 min °C; *max three reasons from:* *idea of photosynthesis:* higher temperatures lead to more photosynthesis / more crop growth; plants need water for, photosynthesis / growth; carbon dioxide + water → glucose + oxygen; *idea of high rainfall effect on soil:* risk of flooding / soil does not dry out / increased surface runoff; soil erosion; crops washed away; soil waterlogged; leaching of nutrients / decreased fertility; AVP;	**max 4**
1(c)(i)	*any three from:* loss of habitat / biodiversity; loss of arable or farm land / land for growing crops / plants can't grow / loss of vegetation; food shortages / famine / malnutrition; silting / sedimentation, of rivers; land less able to soak up water / increased runoff / leads to flooding; loss of nutrients / decrease soil fertility; decrease profits for farmers / economic impact; migration / displacement of people; desertification;	**3**

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Question	Answer	Marks
1(c)(ii)	*any two from intercropping:* different root depths; roots, bind / hold the soil; improves or maintains soil fertility / nutrients / structure; ground is always covered by crops / greater percentage plant cover; (increases) interception; (increases) infiltration; *any two from bunds:* hold back or stores water or soil / soil eroded from higher up the slope is deposited behind the bund; slow down the flow of water / soil; allows greater time for infiltration;	**4**
1(c)(iii)	*any three from:* increases overall /decreases then increases / fluctuated; use of data on forest cover, e.g.: 1940–1980: decrease; 1980: lowest; 1980–1990: increase; 1990–2000 decreased / fluctuated; 2000–2019: increasing; 1940 and 2019: (slight) increased / very similar; 2019 had the largest cover; AVP;	**3**

Question	Answer	Marks
1(c)(iv)	*conclusion based on any four supported pieces of evidence from comments:* *any four from:* *YES* *payments:* reduce deforestation / prevents loss of habitat; maintain biodiversity / reduced genetic depletion / extinction; alternate way of making a living / financial incentive / economic development / generate foreign income; discourages cash crop growth / intensive cultivation or grazing; encourages, ecotourism / sustainable tourism; soil erosion / desertification is prevented; it is a sustainable strategy / or description of sustainability; reduces climate change; (trees) regulate the water cycle; (trees) provide food / medicine / raw materials; AVP; *NO* *forms to fill / not compulsory:* might prevent people from applying / forms are time consuming / need to be literate; may need a computer to complete forms / some people do not have access to electricity; not everyone will join / may not stay in the scheme (as not compulsory); land might be more valuable for other purposes / named purpose; reduced export (or crops); increased government spending; AVP;	**4**
1(c)(v)	*any four from:* trees capture carbon (from the atmosphere); trees act as carbon, sinks / stores; when tree dies / rots / burned, carbon is released; carbon dioxide is a greenhouse gas / increase in greenhouse gas (in atmosphere); leads to global warming / enhanced greenhouse effect; tree loss affects water cycle / named effect of water cycle; e.g. less infiltration / transpiration / evaporation; AVP;	**4**

Question	Answer	Marks
1(c)(vi)	*any one from:* conditions are no longer suitable for some animals (in Costa Rica); species not adapted (to new conditions); loss of habitat; lead to extreme weather / increase in wildfires; extinction (of species); migration of animals; change in hibernation patterns / lack of food; increased in competition; AVP;	**1**

Question	Answer	Marks
2(a)(i)	named producer AND arrow direction → ; rest correct with **four** trophic levels; grass or leaves → cricket → (blue-sided tree) frog → snake / bird;	**2**
2(a)(ii)	camouflaged / cannot be easily seen (by predators or prey);	**1**
2(a)(iii)	*any two from:* (ozone depletion has led to) increased UV / radiation reaching Earth; frogs captured for sale / part of illegal pet trade; disruption due to tourism; predation; less food; can't' lay eggs (on leaves) due to deforestation or loss of trees; AVP;	**2**
2(b)(i)	D;	**1**

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Question	Answer	Marks
2(b)(ii)	axes labels; *x*-axis: (breeding) programme AND letters A–D AND *y*-axis: percentage of adult frogs (still living) after one year; sensible linear scale that covers half the plotted space; correct plotting ± half a small square tolerance; bars of equal width;	**4**
2(b)(iii)	*any one from:* no information on the number (of surviving eggs / tadpoles / frogs); only percentages given; no information on conditions or location of breeding programme e.g. temperature / time of year / when collected; AVP;	**1**
2(c)(i)	unbiased / representative;	**1**
2(c)(ii)	*any one from:* can take an average; data more representative; highlights anomalous results; improves reliability;	**1**
2(c)(iii)	*any two from:* student should not be disturbing an endangered species; difficult to count at night; hard to see / camouflaged; move around / active at night / nocturnal; dangerous to do fieldwork in the dark; AVP;	**2**

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Question	Answer	Marks
2(c)(iv)	*any four from:* position of quadrat: at random / using a grid; quadrat size stated, e.g. 1 m^2, 25 cm^2, 50 cm^2; repeat; observe each quadrat for fixed period of time; observe at a distance / use a camera / take photograph to count; count (all the blue-sided treefrogs in the quadrat); take an average of results; record results in a, table / tally chart; scale up for whole area;	**4**

Question	Answer	Marks
3(a)(i)	*any four from:* damage to: buildings / loss of home; infrastructure e.g. road, hospitals; (farm)land / food / livestock destroyed; area unusable for many years; (cost of) relocation; rebuild / clean-up, costs; (cost of) emergency aid / medical treatment; export / import effect / decrease in foreign investment; tourism decline; loss of trading / job loss / people not being able to go to work / business destroyed; AVP;	**4**

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Question	Answer	Marks
3(a)(ii)	*any three from:* drills; public awareness; early warning / monitoring system; emergency rescue; emergency supplies / stock piling (of food / water / medicines) / field hospital; avoid building in high-risk locations / exclusion zones; planned, evacuation / evacuation location / evacuation route; AVP;	**3**
3(b)(i)	*any four from:* idea of use of heat from, ground / rock cracks / volcanic areas / (decaying) radioactive elements; hot water turns to steam; steam, turns / drives / moves / runs a turbine; turbine, turns / drives / moves / runs a generator (which produces electricity); steam condensed / steam turns to water, at surface / cooling tower; cool water (forced) back into rocks / underground;	**4**
3(b)(ii)	*any two from:* money invested in other technologies / do not have the technology; lack of volcanoes; terrain or conditions not suitable / hot rocks are too deep; can be expensive (to install); other energy sources are available; AVP;	**2**
3(b)(iii)	*any two from:* fertile soil (for growing crops) / better crop growth; mining industry / extraction of minerals ; tourism; scientific research;	**2**
3(c)(i)	table drawn with headings: week AND pH; all data recorded; separate entry for week 6 and 7;	**3**

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Question	Answer	Marks
3(c)(ii)	(yes); pH is, decreasing / becoming more acidic; this suggests, more emissions / more SO_2 / sulfuric acid is produced;	**2**
3(c)(iii)	*any two from:* temperature; humidity; water; oxygen; salinity; light, carbon dioxide;	**2**
3(d)(i)	combustion / burning / extraction of fossil fuels / coal / oil / natural gas;	**1**
3(d)(ii)	*any one from:* reduction in fish populations; damage to crops / vegetation; damage to buildings;	**1**

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