Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/21**

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 (from 1950 to 2019); (rate of) increase (approximately) same / no fluctuations; increased by 4 million / increased from 1 to 5 million;	**2**
1(a)(ii)	*any two from:* increased life expectancy / lower death rate; better access to: education; healthcare; clean water / sanitation; electricity; limited access to family planning; migration; pro-natalist policies; AVP;	**2**
1(a)(iii)	3 892 200;	**1**
1(b)(i)	*any two from:* homes close together / overcrowding; no organised waste / garbage collection; limited access to clean water; limited sanitation / sewage / human waste, management; AVP;	**2**
1(b)(ii)	cholera / typhoid / e.q.;	**1**

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Question	Answer	Marks
1(b)(iii)	*any two from:* employment / economic reason; avoiding natural disasters, e.g. volcanic activity; crop failure; better services / schools / hospitals; (access to) electricity; improved security; AVP;	**2**
1(c)(i)	*from* January *to* April;	**1**
1(c)(ii)	26.2 – 23.9; 2.3;	**2**
1(c)(iii)	idea of *one from wet season AND one from dry season plus any other one:* *wet season:* increased rainfall; mud / debris / fallen trees, from landslides; road, impassable / dangerous; *dry season:* hot temperatures / no rain; road, dry / passable; AVP;	**3**
1(c)(iv)	*min one/max two from climate data:* there is rain even in the dry season / wet all year / quoted rainfall data, e.g. lowest rainfall is 84.8 mm; warm all year / tropical climate / quoted temperature data, e.g. lowest temperature is 23.9 °C / limited range of temperature; *max two from explanation:* warm enough for plant growth (all year) / optimum temperature for photosynthesis or plant growth; plants need water and (sun)light to, produce food / photosynthesise; carbon dioxide + water → glucose + oxygen; (sun)light provides the energy for photosynthesis;	**max 3**

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Question	Answer	Marks
1(d)(i)	*any three from:* soil erosion; desertification; less interception; increased runoff; increased flooding; climate change / global warming; habitat loss; loss of biodiversity / disrupts food webs; genetic depletion;	**3**
1(d)(ii)	46;	**1**
1(d)(iii)	*any four from reasons why land was deforested:* population (of Costa Rica) increased; *land needed for:* homes / urbanisation; crops / cattle / beef / to feed people / farms; timber; build, hotels / holiday homes / tourist facilities; financial incentive / economic benefit / more profit; cash crops grown; AVP;	**4**
1(d)(iv)	*x-axis:* time / period / time period **AND** time periods shown; *y-axis:* (percentage) rate of deforestation; sensible linear scale that covers half the plotted space; correct plotting ± half a small square tolerance;	**4**
1(d)(v)	the time periods are not equal / cannot compare the time periods / data stops at 2000 / do not know current deforestation rate / only between 1900 and 2000;	**1**

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Question	Answer	Marks
1(d)(vi)	*strategy 1:* *any one from:* financial incentive AND reason, e.g. could offset the money lost; trees have chance to recover / idea of selective logging / sustainable logging / paying to replant trees; *strategy 2:* *any one from:* mature forests have many trees / new trees can grow in the protected (mature) forest / trees act as carbon store; forces people to look for alternatives, e.g. recycling / use trees sustainably; raises awareness about environmental value of trees / biodiversity;	**2**
1(d)(vii)	*any two from:* national parks / reserves or protected area / biospheres / ecotourism / sustainable tourism / quotas for cutting down trees / introduce fines for deforestation / enforcement of laws;	**2**
1(e)	*any three from:* intensive farming; use of fertilisers; intercropping; controlled environments / hydroponics / greenhouses; genetically modified organisms; selective breeding of animals and plants; mechanisation; (improved) irrigation / named example, e.g. trickle drip; crop rotation; insect control (insecticide and biological control), weed control (herbicide), fungi control (fungicide); mulching;	**3**

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Question	Answer	Marks
2(a)(i)	*any two from:* high nest failure rate; increased predation; loss of food; disease; tourism / human settlement / habitat disturbed;	**2**
2(a)(ii)	*any three from:* range of habitable areas may change or decrease; as areas become too hot or too cold; more extreme weather events; leads to, unfavourable climate in established habitats / destruction of existing habitats / more wildfires which destroy habitat; increased temperatures; lead to, change in plants growing in area / change in available food / drought / loss of land; more favourable conditions for predators / invasive species;	**3**
2(a)(iii)	(wild) avocado (tree) as producer; rest correct; wild avocado trees → (lizard →) (Resplendent) Quetzal → hawk / owl	**2**
2(b)(i)	*any four from:* transect is systematic sampling method; description of a transect, e.g. along the path, direction of the path; (known compass bearing,) use length of string or measured distance in straight line; transect location selected at random; count number of birds seen / heard along the transect line; record results table or tally chart; repeat for different transects / different parts of forest or location; take an average; AVP, e.g. time spent at each point;	**4**
2(b)(ii)	4 multiplied by area (of all forests);	**1**

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Question	Answer	Marks
2(b)(iii)	*any two from:* birds are easier to hear than see; automated / fewer people needed; can be carried out continuously / can be done day or night; does not rely on people's judgement (that they have seen the correct bird); birds may be scared away by people (so observation method may be biased); can be used in remote locations; AVP;	**2**
2(b)(iv)	*any one different advantage and one different disadvantage from each method*: *method 1 and 2:* *advantage once for either method 1 or 2*: doesn't disturb the birds; *method 1:* *advantage*: can refer back over many years / visual record / can see what they have eaten; *disadvantage:* depends on seeing the bird with food in its beak / difficult to see what is in beak; nesting time is only for a few months a year; diet to feed chicks might be different from adult food; only shows what they eat in nest / doesn't show what they eat away from nest; *method 2:* *advantage:* does not rely on sightings of birds; *disadvantage:* food will be digested so difficult to tell what it is; expensive / droppings will need to be analysed (to see what they contain); difficult to distinguish between the droppings of different species of birds; AVP;	**4**

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Question	Answer	Marks
3(a)(i)	*any two from:* financial incentive to reduce, consumption / emissions; money raised can used to fund environmental projects; idea of financial payment / off-setting, carbon (dioxide) emissions; switch to renewable / alternative forms of energy;	**2**
3(a)(ii)	*any two from:* carbon dioxide: captured during photosynthesis; stored in trees; stored underground / oceans / sequestration / named method; removed / stored so does not enter the atmosphere;	**2**
3(b)(i)	*any two from:* biofuels; geothermal power; tidal power; wave power; solar power; wind power;	**2**
3(b)(ii)	*any four from:* (stored) water in reservoir is high up / behind a dam / has gravitational potential energy; water flows down to turbine or from dam or downhill / water has kinetic energy; (moving water) causes turbine to rotate; (turbine) turns generator (electricity produced); kinetic energy is transferred to, electrical energy / electricity;	**4**
3(b)(iii)	table drawn with column headings: day and electricity generated; unit: MW; all data recorded;	**3**

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Question	Answer	Marks
3(b)(iv)	*any two from:* (reservoir used for) leisure activities; source of drinking water; water storage / irrigation; sell the electricity to other countries; control of water flow / flood prevention; fishing; economic benefit;	**2**
3(b)(v)	(methane is a) greenhouse gas; contributes to climate change / global warming;	**2**
3(c)(i)	measured distance; conversion;	**2**
3(c)(ii)	*any four from:* jaguars could become extinct (in Costa Rica); dam disturbed / reduced / lost the jaguar habitat; prevent jaguars travelling (from one population to another); idea of corridor reducing chances of breeding / less chances of jaguar finding a mate; reduces genetic flow / reduces gene pool; jaguars more likely to encounter people (now that dam is built); prey scared away / less food; AVP;	**4**

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