Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/23**

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.

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.

6	<u>Calculation specific guidance</u> 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	<u>Guidance for chemical equations</u> 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.

Question	Answer	Marks
1(a)(i)	0.488(%);	**1**
1(a)(ii)	*any one from:* no refrigeration / difficult to preserve food; no heating or cooling; lack of communication; no lighting; AVP;	**1**
1(a)(iii)	less chance of, water and sewage mixing / drinking contaminated water / catching a water-related infectious disease e.g. cholera or typhoid; AVP;	**1**
1(b)	*any two from:* growth in tourism; fewer people employed in or less, agriculture; government has invested in or improved the services e.g. infrastructure / education / healthcare / clean water / sanitation / electricity (so more jobs in these areas); people have more education so can access different jobs; 78% of population live in urban areas so less able to do other jobs e.g. agricultural; AVP;	**3**
1(c)(i)	*any two from:* decrease then increase; less area of land forested in 2010 compared with 1940; 1940–1987 decrease; 1983–1987 stable; 1987–2010 increase; relevant quoted data; AVP;	**2**

Question	Answer	Marks
1(c)(ii)	*any three from:* habitat loss; soil erosion; desertification; climate change; loss of biodiversity; loss of food / producers; genetic depletion;	**3**
1(c)(iii)	*any two from:* not restricted to one country; greenhouse gases spread throughout atmosphere; climate change results in flooding / sea level rise; climate change results in droughts / excessive rain; genetic depletion so less likely to find medicines / improve crops / livestock using genes from wild populations;	**2**
1(d)(i)	331.4 / 331 (mm);	**1**
1(d)(ii)	290–140; 150;	**2**
1(e)(i)	(chlorophyll) absorbs light / energy; energy needed for photosynthesis / to make glucose;	**2**
1(e)(ii)	a crop that is grown, to sell / for profit / to be sold;	**1**
1(f)(i)	axes labels; *x*-axis: (energy) resource AND *y*-axis: percentage or % of electricity generated; sensible linear scale that covers half the plotted space; correct plotting ± half a small square tolerance; bars of equal width;	**4**
1(f)(ii)	98(%);	**1**

Question	Answer	Marks
1(f)(iii)	burning or combustion (of fossil fuels); produces carbon dioxide / greenhouse gases;	**2**
1(g)(i)	*any two from:* wind turns / runs / moves turbines; turbine or drive shaft turns / runs / moves generator (that produces electricity);	**2**
1(g)(ii)	*any two from:* noisy; may feel that it spoils the view / visual pollution; kills birds; AVP;	**2**
1(g)(iii)	*any two from:* lack of wind; turbines have to be shut down when there is too much wind; terrain not suitable; windiest places are often in remote areas; lack of money to invest in new technology / turbines are expensive to, manufacture / install / maintain; requires a backup generating capacity; no space to install them; AVP;	**2**

Question	Answer	Marks
2(a)(i)	*any three from:* nest already made / bird does not have to make hole in tree; can put in safe location; can put away from tourists; easier to monitor; prevents predators climbing into the nest; uses less energy / time (for the bird); can put in areas where no dead trees; AVP;	**3**
2(a)(ii)	*any three from:* hunting prohibited; cutting down trees prohibited; mining prohibited; tourism restricted; ranger programmes / educate visitors; scientific research; need a guide; managed paths; AVP;	**3**
2(b)(i)	avocado (tree);	**1**
2(b)(ii)	(long-tailed) weasel;	**1**
2(c)(i)	remove stone AND skin / weigh the flesh only;	**1**
2(c)(ii)	152;	**1**
2(c)(iii)	it is, anomalous / an outlier / much lower than the other values;	**1**
2(c)(iv)	C AND greatest mass;	**1**

Question	Answer	Marks
2(c)(v)	random; suitable random sampling method described, e.g. random number table or generator / numbers out of a hat; **OR** systematic; suitable systematic sampling method described, e.g. every third tree / every other tree;	**2**
2(c)(vi)	*any two from:* algae decompose or rot / bacteria feed on them; uses up the oxygen / not enough oxygen;	**2**
2(d)	*any two from:* reproduction; fertilisation; production of seeds or fruit;	**2**
2(e)(i)	*method 2:* samples more trees / bigger area; longer sampling time; more representative; repeated AND can get an average / identify anomalous results; bees less likely to be harmed; people less likely to be stung; AVP;	**3**
2(e)(ii)	*tally correctly used to show:* 2 bees in sample 3; 33 bees in sample 4;	**2**
2(e)(iii)	*any two from:* competition / predation; habitat loss / industrialisation / deforestation; climate change / global warming; disease; monoculture / lack of (continuous) food; AVP;	**2**

Question	Answer	Marks
2(e)(iv)	*any two from:* crop rotation; improved irrigation e.g. trickle drip; mechanisation; selective breeding of animals and plants; genetically modified organisms / high-yielding varieties; controlled environments / greenhouses / hydroponics; biological control; AVP;	**2**

Question	Answer	Marks
3(a)(i)	destructive ;	**1**
3(a)(ii)	*any three from:* Cocos / oceanic plate is more dense / Caribbean or continental plate is less dense; Cocos / oceanic plate, moves under / sinks under / subducts; forming a trench; the Cocos / oceanic plate is being destroyed / (friction makes) the rocks melt; magma rises / magma is forced up; forming the (Arenal) volcano; earthquakes;	**3**
3(b)	*any three from:* fertile soil (for growing crops) / better crop growth; mining industry / extraction of minerals ; tourism; scientific research; geothermal;	**3**

Question	Answer	Marks
3(c)(i)	*any four from:* reservoir / river, contaminated; reduced drinking water; respiratory problems (due to ash); roads blocked / only one or two roads into / out of villages / towns; difficult to evacuate; loss of buildings / land / town / habitat; crops covered in ash / crops lost; livestock starvation (as no crops to feed them); economic / tourism, impact;	**4**
3(c)(ii)	*max 2 before:* monitoring / warning; land use zoning; structure of buildings; drills; stockpiling; evacuation; training of, emergency or rescue teams; *max 2 during and after:* idea of planned method of communication; emergency supplies e.g. clean water / food / medicine; emergency rescue teams; rebuilding of damaged areas; financial / international / government, aid; AVP;	**4**

Question	Answer	Marks
3(d)(i)	*any two from:* (yes because): 4th most likely natural hazard; Costa Rica on plate boundary; Arenal has erupted before; 80 died in 1968 eruption / volcanoes have major impact; (no because): other hazards occur more frequently / 4th most likely natural hazard; so money better spent, elsewhere / on named hazard; AVP;	**2**
3(d)(ii)	*any two from:* increase in (global) temperatures / hotter weather; increase in drought / vegetation is drier / land drier; vegetation can catch fire more easily; more extreme weather e.g. lightning strikes; AVP;	**2**
3(d)(iii)	*any two from:* (forms) between 5° and 20° north and south of the Equator; (ocean surface) temperature of at least 27 °C; ocean depth of at least 60 m;	**2**