Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **February/March 2022**

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 February/March 2022 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)	7.62 million / 7 620 000;	**1**
1(a)(ii)	*any two from:* M1 high population growth rate; high birth rate / 4.93 per woman; low life expectancy; AVP;	**2**
1(a)(iii)	*any two from:* expensive healthcare needed, e.g. immunisations; lack of hospitals; puts pressure on education system / large class sizes / more teachers needed; lack of jobs; overcrowding; AVP; e.g. don't pay taxes	**2**
1(a)(iv)	*any three from:* road made of dirt / not tarmac; no motor transport / only animal transport; (cart/one person) can only carry a small load; no, lighting / drainage; rubbish by road; simple buildings / buildings close together / homes built of poor materials;	**3**
1(b)(i)	*any four from:* *inputs:* carbon dioxide (from air through leaves); water (from soil through roots); chlorophyll / chloroplasts; (chlorophyll / chloroplasts) trap energy from the Sun / light energy / light energy converted to chemical energy; *outputs:* glucose; oxygen;	**4**

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Question	Answer	Marks
1(b)(ii)	*any three from:* pollen / male sex cells; moves from anther; M3 to stigma; in same flower / from flowers on same plant;	**3**
1(c)(i)	higher value / lower transport cost / easier to transport a liquid / more demand / longer shelf life;	**1**
1(c)(ii)	*any two from:* biomass fuel; feed for animals; fertiliser; mulch; AVP;	**2**
1(c)(iii)	*any two from:* keeps people employed; country / government earns, money / taxes / increase GDP / foreign exchange; so more to spend on infrastructure / named example; AVP; e.g. economic growth	**2**
1(d)(i)	1153 (mm);	**1**
1(d)(ii)	*any two from:* growing / climate, requirements for peanuts are met; 24 °C or above all year / warm all year; more than 700 mm annual rainfall / a lot of rain all year; reference to figures;	**2**
1(d)(iii)	*any two from:* coldest month / minimum temperature for growth; rate of photosynthesis decreases reduced photosynthesis; no rainfall / 0 mm rain; roots cannot absorb enough water;	**2**

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Question	Answer	Marks
1(d)(iv)	*any two from:* highest rainfall / heavy downpours; interception decreases; some does not infiltrate / soil saturated / flooding; run-off increases; soil, washed / carried away; leaching / nutrients removed;	**2**
1(e)(i)	*any two from:* no crop rotation; (same) minerals removed each year; drop in fertility / nutrient deficiency; other reference to damaged soil, e.g., compaction / soil erosion; increased pest / disease;	**2**
1(e)(ii)	*any two from:* no waste; don't need (to buy) as much food for animals; animals produce meat / milk; manure goes back onto land as a fertiliser; not relying on one form of income; ref. to food security;	**2**
1(e)(iii)	*any two from:* mixed / intercropping; crop rotation / leave fallow; improved irrigation / named improved irrigation technique, e.g. trickle drip; grow pest resistant varieties; green manure / legumes; peanut waste as, fertiliser/compost / add an organic fertiliser; grow other crops; agroforestry; AVP, e.g. rainwater harvesting / biofuel;	**2**

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Question	Answer	Marks
2(a)(i)	*any three from:* suck tube on left / suck air through pooter; insect gets sucked in other tube; gauze prevents insect entering mouth; insect falls / trapped, in pot;	**3**
2(a)(ii)	*any valid random method described:* divide the field into areas / grid squares; use random number generator / dice to select grid squares to be sampled;	**2**
2(a)(iii)	10 AND 13;	**1**
2(a)(iv)	M1 axes labelled; average number of insects (on 5 leaves), field M2 suitable linear scale such that data occupies over half of the grid; M3 bars plotted correctly; M4 bars equal width;	**4**
2(b)	*any two from:* leaves: yes, field B had more insects on the leaves (than field A); soil: no, field B had the same number of insects on the soil / in the pit trap (as field A); *cannot make a firm conclusion:* more data is needed; depends on type of insect;	**2**
2(c)(i)	any 1 in correct place; all 3 correct; sand silt clay	**2**
2(c)(ii)	nitrate (ion) / NO_3^-; potassium (ion) / K^+;	**2**

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Question	Answer	Marks
2(c)(iii)	*any three from:* organic content; M2 air; water; bacteria / microbes / (micro)organisms / named microorganism; animals;	**3**
2(d)	*any one from:* terracing; contour ploughing; wind breaks; maintaining vegetation cover; add organic matter / mulching; planting trees; mixed cropping / intercropping / crop rotation;	**1**

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Question	Answer	Marks
3(a)(i)	*any two from:* can make more blocks / less material needed; M2 air in holes reduces conduction / blocks provide more insulation; lighter / less dense; less drying time / quicker / easier (to dry); AVP; e.g. less labour (cost)	**2**
3(a)(ii)	*any two from:* quicker / more blocks can be made; blocks have uniform shape; machines can compress more tightly; lower labour cost; AVP; e.g. 24 hour operation	**2**
3(b)(i)	*any three from:* M1 carbon dioxide is a greenhouse gas; absorbs / traps, (long-wave) radiation; (more) heat is retained within the atmosphere / less heat is released; increases global temperature;	**3**
3(b)(ii)	methane / CH_4;	**1**
3(c)(i)	*any two from:* M1 limit who can make or sell it / licences; nationalise; increase prices; taxation; use of a <u>named</u> alternative e.g. stone, mud, clay, animal waste	**2**
3(c)(ii)	*any two from:* encourages, deforestation / illegal logging / habitat destruction / loss of biodiversity / soil erosion; contributes to greenhouse effect; wood should only be available from sustainable sources; host to termites or other pests; AVP; e.g. wood rots / fire risk	**2**

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Question	Answer	Marks
4(a)(i)	*any two from:* in open-pit less risk of: collapse; suffocation / build-up of dangerous gases; explosions; flooding;	**2**
4(a)(ii)	*any two from:* for jobs / employment / job security; to improve infrastructure of area; bring money to the area / increase standard of living of local people / income; AVP; e.g. contribute to economy of the country	**2**
4(a)(iii)	*any three from:* to make sure, damage to environment is limited/eq; is temporary / ref. to restoration; not a cause of serious pollution / to reduce or control pollution; does not destroy habitat; ensure no endangered species / does not endanger species; to ensure safety standards; to know how waste will be dealt with; to listen to local people's views; AVP;	**3**
4(a)(iv)	*any four from:* landscape to make shape more natural; use as a lake for, fish / water supply / recreation; fill hole with, overburden / waste rock / land fill site; cover with topsoil; use fertilisers; plant seeds / grasses / plants; then shrubs and trees; soil improvement; bioremediation; description of bioremediation; AVP e.g. one example of end-use: farming / nature reserve / park / solar farm / landfill site	**4**

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Question	Answer	Marks
4(b)	*any four from:* recycling / reuse; improved efficiency of extraction / secondary extraction; improved efficiency of use; using alternatives; legislation; do not exhaust a supply / save some for future generations; quotas on extraction; AVP e.g. reduction in use;	**4**

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