Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **October/November 2020**

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 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)	3.6(21) (million);	**1**
1(a)(ii)	*any two from:* increased, cost / use of, (health) care; increased (cost of) pensions; younger people need to care for older people / people have more children to care for older people / more (older) dependants; shortage of (working age) workers; increased potential for selling, goods / services, to older people; increased knowledge base; effect on economy with reason e.g. increased economy as, more businesses / more people / more taxes, decreased economy as fewer taxpayers	**2**
1(b)(i)	132 (mm);	**1**
1(b)(ii)	*x*-axis fully labelled: month **AND** *y*-axis fully labelled with unit: (average) temperature / °C; linear scale such that plots occupy at least half of grid; 8 plots correct; 11 plots correct;	**4**
1(b)(iii)	increase / high / more **AND** more refrigeration / air conditioning units / fans, used / needed;	**1**
1(b)(iv)	(sun)light all year round; (light needed) to produce food (in plants) / for photosynthesis;	**2**

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Question	Answer	Marks
1(c)(i)	*any four descriptive comments but:* *max 3 about category or direction of hurricane:* starts as category 5 (offshore); (with direction of travel) category decreased / category 5 to category 1; reference to distance travelled at stated category, e.g. cat 2 for, 200 km / 450 km over land; hurricane travelled from S / SE **OR** moved towards N / NW; AVP; *max 2 about storm surge size or location:* range 0.6–2.4 m; highest in north east / Atlantic Ocean coast; lower storm surge on north west / Gulf of Mexico coast; increased through Atlantic Ocean; AVP; *max 1 about wind speed:* (with direction of travel) wind speed decreases / wind speeds greater than 252 (km / h); AVP;	**4**
1(c)(ii)	*any four from:* *idea of short-term effect:* (extraction or export) reduced / stopped; due to, dust / debris (in air); flooding (of mine); no ships / planes / transport (for export) / roads damaged / blocked; damage to machinery; land damaged **OR** soil contaminated (after flooding); infrastructure damage, e.g. electricity / communication; *idea of long-term effect:* idea of, recovery time / reduced demand; water must be pumped away / wastewater must be treated; phosphate entered groundwater (so must be cleaned up) / contaminated water; workers, not safe to work / killed / injured / sick from disease; economic impact, e.g. customers go elsewhere / loss of jobs / less money made as less extracted / loss of profit;	

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Question	Answer	Marks
1(c)(iii)	one mark for minimum of three stated strategies; *any five developments from:* *radio announcement:* non-English speakers might not understand message / other method could have been used; early warning system in place; which, reduced loss of life / allowed evacuation; *one road:* could have caused delays in evacuation; build other, road / means of escape route; road, surrounded by water / could have flooded; *shelters:* (some tourist / residents) did get to a shelter (so strategy effective); indicate prior disaster prevention planning; *signs:* (signs have a picture) so easy to understand / help non-English speaking people / ORA; *food and water:* people less likely to get diseases / don't eat contaminated food / drink contaminated water; *doctor available:* people do not need to leave the shelter if they are ill / reduced risk of, injuries / disease; *phone signal:* build, more / hurricane-proof, phone masts / find other way of getting messages; *message home:* prevent rescuers searching unnecessarily for people; families knew if people missing; *temporary housing:* reduces risk of death from, cold / heat; people had a place to live after the hurricane; reduces risk of diseases; AVP;	**6**

Question	Answer	Marks
2(a)(i)	**A** sampling points, are only at one end / are close to each other / don't cover whole line; **C** sampling points, not at even distances / randomly spaced; **D** not enough sampling points;	**3**
2(a)(ii)	price of phosphate has decreased;	**1**
2(a)(iii)	*any two from:* questions, do not address the questionnaire purpose / are not about the mine; questions, leading / biased / only refer to benefits; not enough questions / not enough data; AVP, e.g. no information on who was questioned or selection method, e.g. age / sex;	**2**
2(a)(iv)	*any suitable question <u>about the mine or impact of the mine</u>, e.g.:* Are you in favour of a new phosphate mine?; Do you think there is a need for a new phosphate mine?; Would you object to a new phosphate mine?; Do you think the mine will cause pollution?; AVP;	**1**
2(a)(v)	2.7–3 cm distance measured on map; 1.3–1.5 km, so therefore can mine;	**2**
2(a)(vi)	*any two from:* removes, habitats / shelter / food source; (so) species, migrate / starve / die; (which leads to) loss of biodiversity / genetic depletion / extinction / disruption of food, chains / webs; correct <u>effect</u> of deforestation, e.g. soil erosion, desertification, reduced soil fertility; AVP;	**2**
2(a)(vii)	*any two from:* increased efficiency of (phosphate) extraction; recycling (of phosphate rock); education of customers (on how to efficiently use phosphate);	**2**

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Question	Answer	Marks
2(a)(viii)	*any two from:* *land reclamation / ORA:* costs less / economic reason; quicker / easier; gives a named beneficial use (for the land), e.g. farming, tourism;	**2**
2(b)(i)	N = nitrogen; K = potassium (ions);	**2**
2(b)(ii)	*any two from:* adds, nutrients / minerals / ions (to soils); which are needed for plant growth; increases yield; leads to increased profit;	**2**
2(b)(iii)	*any two from:* concern about, excess / overuse of, fertiliser; leads to nutrient enrichment (of water) / eutrophication / <u>water</u> pollution; want to grow organically; economic reason, e.g. cost of fertiliser; crops are growing well without fertilisers / soil already has nutrients;	**2**
2(c)(i)	table with two columns / rows **AND** headings (distance, concentration); units: (distance) km **AND** (concentration of phosphate) mg / *l*; five sets of results recorded in order of distance;	**3**
2(c)(ii)	(north of mine) concentration of phosphate will be, lower / not contaminated with phosphate / owtte;	**1**
2(c)(iii)	*any three from:* formed over millions of years; from, dead marine organisms / dead organisms on seabed; (remains of dead organisms) covered in, mud / sand / sediment; temperature / pressure, increased (causes oil to form);	**3**

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Question	Answer	Marks
2(c)(iv)	*any two from:* carbon dioxide is a greenhouse gas; leads to, climate change / enhanced greenhouse effect / global warming / global warming described; effect of climate change. e.g. flooding, drought, forest fires, loss of land, stated effect on crop yield or plant growth;	**2**
2(c)(v)	*any three from:* carbon capture / carbon storage; transport policies; (international or national or local) agreement / policies / laws / treaties; reduction in reliance on fossil fuels / use renewable resources; have fewer children; switch to a plant-based diet; reforestation / afforestation / decrease deforestation; use (more), energy-efficient devices / energy-efficient cars / electric cars; AVP, e.g. switch to renewable supplies, turn off appliances, improve building design, tax fossil fuels;	**3**
2(c)(vi)	no borders (in the atmosphere) / idea that if neighbouring country is polluting, then this will reach other countries / atmospheric circulation or wind patterns / idea of point of no return to act;	**1**

Question	Answer	Marks
3(a)(i)	5180 (km^2);	**1**
3(a)(ii)	*any two from:* building of canals; disruption of water-flow (due to human activities); drainage (of wetlands); urbanisation, e.g. road construction, water supply, infrastructure, homes; (intensive) agricultural (practices); climate change / global warming; mining / raw materials;	**2**

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Question	Answer	Marks
3(a)(iii)	*any two from:* sustainable tourism / ecotourism / limit tourism; water conservation area; limit, storm / run-off; educate people / raise awareness, about the area; restrict activities, e.g. ban, hunting / cutting down trees / grazing / canal building; fines (for illegal activity); (make the non-national park area into) wildlife reserve / corridor / extractive reserve / (world) biosphere reserve / buffer zone; AVP;	**2**
3(b)	can't tell them apart / might kill a crocodile by mistake;	**1**
3(c)(i)	orchid (plant);	**1**
3(c)(ii)	*any three from:* vector control; (mosquitoes killed by spraying with) insecticide; sterilise male mosquito; removal of, stagnant water / breeding grounds; cover wells / use sloping roof buildings; place oil on water; biological control; antimalarial drugs to protect people; (prevent bites by using) repellent / nets;	**3**
3(d)(i)	*any two from:* out-competes native species / uses up resources; disrupts, food chains / food webs / biodiversity; no (native) consumer; needs to be cleared;	**2**
3(d)(ii)	*limitation:* can only record plants that are large enough to be seen (from the air) / can't fly if weather is poor / expensive / difficult to identify different species (from a distance); *advantage:* covers large areas / quick / covers all terrains;	**2**

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Question	Answer	Marks
3(d)(iii)	*any five from:* use transect **OR** a grid (to determine the location of the quadrats); *transect*: systematic / regular intervals, e.g. at every 5 m, take 10–25 readings **OR** *grid*: random; size of quadrat 1 m × 1 m; estimate the percentage or coverage of pepper plants (in the quadrat); record results in a suitable format, e.g. table or tally or chart; repeat **AND** take an average; calculate the (average) percentage or coverage per quadrat; determine percentage coverage per m^2;	**5**
3(d)(iv)	*any two from:* native / other, plants and animals also burnt; kills endangered species; danger of causing a wildfire / idea of fire getting out of control; causes, atmospheric pollution / increase in carbon dioxide concentrations; leads to, global warming / named effect; damages, settlements / farming land / national park; (possibility of causing) respiratory illness / difficulty in breathing / named effect, e.g. asthma;	**2**

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