Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/23**

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	<u>'List rule' guidance</u> 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)	(difference = 21.3 – 18.8 =) 2.5; (2.5 ÷ 18.8 × 100 =) 13(.3)(%);	**2**
1(a)(ii)	*any two from:* financial impact as more people to feed; more land needed for agriculture / building; loss of biodiversity as more land needed to, house / feed people; more older people so greater cost for health care or social care; increase in economic wealth as more people spending money; more jobs needed / unemployment; more infrastructure needed e.g. roads, communications; more facilities needed e.g. hospitals, schools;	**2**
1(a)(iii)	*any two from*: family planning; improved health and education (of woman); national population policies / pronatalist / antinatalist;	**2**
1(b)(i)	(27 – 18 =) 9 (°C);	**1**
1(b)(ii)	*x*-axis fully labelled; *y*-axis fully labelled with units and sensible linear scale; 8 plots correct; 12 plots correct;	**4**
1(b)(iii)	*any two from:* many hours of sunshine each day; warm all year / no frost / no cold weather; plants need sunlight (to produce) food; reference to photosynthesis;	**2**

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Question	Answer	Marks
1(c)(i)	*any three from:* increased temperatures / (enhanced) greenhouse effect; melting of, ice sheets / glaciers / permafrost; rise in sea level; low elevation / low lying land / most of land is between 0–44 m above sea level; 2170 km / a lot of, coastline (in Florida); flooding / loss, of land; need to relocate;	**3**
1(c)(ii)	*any suitable strategy plus explanation, e.g.:* increased use of renewable energy / improved energy efficiency reduced use of fossil fuels / taxation on fossil fuels; means reduction in carbon dioxide / greenhouse gas emissions; and hence reduction in (effects of) climate change;	**3**
1(d)(i)	value between 209 and 251 stated OR range stated;	**1**
1(d)(ii)	*any four from:* hurricane travelled, N-NW / along coast of Florida; coastal area is low lying; heavy or prolonged rainfall / flooding / storm surges; high winds; part of route of Irma was through densely populated area / most of population is around the coast; damage to homes / infrastructure; injuries / death; greater impact on west coast (compared to east coast); quoted data of height;	**4**

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Question	Answer	Marks
1(d)(iii)	*any four from:* *idea of short-term effect:* economic effect; crops destroyed; livestock die; reduced or stopped the export; not safe to harvest the crops / look after livestock; no ships / no transport, for, crops / livestock; soil contaminated (with sewage / salination); *idea of long-term effect:* idea of recovery time; trees need replanting; soil washed away; no seeds for following year; no food for livestock; customers go elsewhere; positive effect of silt deposition / increased soil fertility;	**4**

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Question	Answer	Marks
1(d)(iv)	conclusion based on evidence; *any five from:* *positives:* evidence of disaster planning as people were evacuated; emergency shelters available to protect people – indicates prior disaster prevention planning; visual instructions with signposts on road; messages given by radio station; radio station frequency given on road signs; people who do not speak English would have understood the visual signs; people were given temporary housing quickly, this reduced injury / death numbers; bottled water reduced chance of, disease / cholera; *negatives:* not everyone has a radio; people died so planning did not save them / only 90 people died which is small number compared to total population; 53 million USD of property damage so not built to withstand hurricanes; Florida gets many storms so, people / government, should be better prepared; it took weeks to get water back to homes, this would increase risk of disease;	**6**

Question	Answer	Marks
2(a)(i)	data recorded correctly; using tally system correctly;	**2**
2(a)(ii)	*any one from conclusion 1:* the section sizes are not equal (so cannot be compared); sections may not contain the same habitats; *any one from conclusion 2:* (birds can fly so) the same bird could be counted more than once; not enough data collected; sample was only taken on one day; only one sample per section;	**2**

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Question	Answer	Marks
2(a)(iii)	grass;	**1**
2(a)(iv)	*any two from:* (in captivity) fewer predators; better diet for parents; eggs / parents, can be protected; AVP, e.g. availability of, medicine / vet care;	**2**
2(b)(i)	control / to see the effect without fertiliser;	**1**
2(b)(ii)	*any two from:* **Y** is the most effective fertiliser / **Y** increases the yield by the most; **X** and **Y** both increase the yield compared with no fertiliser; (for **X** and **Y**) the effect / increase in yield, reduces after 20 years;	**2**
2(b)(iii)	*any two from:* different sized fields; different planting distances; no data about starting soil conditions / different starting soil in each field;	**2**
2(b)(iv)	*any three from:* concern over nutrient enrichment / eutrophication / algae blooms; concern over leaching / fertilisers entering water; concern over loss of biodiversity; want to grow organically; financial restriction;	**3**
2(b)(v)	*any three from:* crop rotation; irrigation / named example; insect control / insecticide / biological control / weed control / herbicide / fungi control / fungicide; mechanisation; selective breeding; genetically modified organisms / GMO; controlled environments / greenhouses / hydroponics;	**3**

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Question	Answer	Marks
2(b)(vi)	*any two from:* low water permeability / high water holding capacity / water saturated; poor drainage; particle size, small / less than 0.002 mm; low air content / few or small air spaces;	**2**
2(b)(vii)	5 cm distance on map; (cannot build because) (1 cm = 0.5 km so 5 cm =) 2.5 km;	**2**
2(c)(i)	*no mark for drawing on the map – mark is for explanation.* *any three from:* *between mine and field:* contamination here will indicate the mine may be polluting the water; *before the mine:* if water is contaminated above the mine, it will not have come from the mine; *after the field:* to compare the concentrations of phosphate to see if they decrease along the length of the river; *along the length of the river:* to have a representative sample along the whole river;	**3**
2(c)(ii)	table drawn; two columns / rows, with suitable titles, e.g. location / sample site / position AND (concentration of) phosphate;	**2**
2(d)(i)	<u>method 1</u>: *positive:* this will give a lot of data / includes, all people / all age groups / children; *negative:* too many people to ask / not realistic to ask / expensive / will be difficult to process; <u>method 2</u>: *positive:* (every third house means) a representative sample will be obtained / a (more) manageable amount of data (than method 1); *negative:* excludes the men / biased towards women;	**4**

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Question	Answer	Marks
2(d)(ii)	*any three suitable suggestions, e.g.:* assess current state of environment in the area of the planned mine, e.g. are there any endangered species; suggest alternatives to the proposed project; plan for mitigation of negative impacts of mine, e.g. waste, noise pollution, visual pollution; publish a report;	**3**

Question	Answer	Marks
3(a)(i)	*any three from:* conserve biodiversity; for drinking water / recharges aquifer; protect, the endangered / threatened species / named species e.g. sandhill crane, American crocodile; size of Everglades has decreased; people are building canals; prevent urbanisation;	**3**
3(a)(ii)	*any three from:* not exploiting the natural environment; keep to footpaths; don't leave litter; don't start fires; don't feed, animals / birds; don't scare wildlife; conserve water; reduce use of electricity / don't use air conditioning; stay with local communities (rather than hotels); eat local food / don't eat imported products; respect local customs/traditions; consult with local communities on planned tourist developments; ensure infrastructure benefits local people (and not just tourists);	**3**
3(b)(i)	sandstone / shale;	**1**
3(b)(ii)	precipitation / surface run-off / infiltration;	**1**

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Question	Answer	Marks
3(b)(iii)	*any two from:* (more) water from ocean / salt water, enters aquifer / water becomes brackish / (salt water) intrusion; water is not drinkable / reduces amount of water (for drinking); water cannot be used for irrigation / damages vegetation or crops;	**2**
3(b)(iv)	*any two from:* threat of, contamination / run-off / leaching; example, septic tanks / sewage / landfills / pesticides / fertilisers / gasoline / chemicals; can directly interact with natural (bodies of surface) water; can directly interact with, man-made (bodies of surface water) / streams / lakes / canals / reservoirs; causes flooding;	**2**

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