Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/21**

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)	(21.3 ÷ 326 × 100 =) 6.53(4) (%);	**1**
1(a)(ii)	*any two from:* for employment opportunities / for higher income / to move away from poverty; for better, health care / electricity supply / sanitation / transport / infrastructure; for education; due to family ties; to escape natural disaster to escape disease; to avoid war / conflict / for political/economic stability / for safety / refugee status; AVP, e.g. for attractive (tropical) climate;	**2**
1(b)(i)	8;	**1**
1(b)(ii)	x-axis AND y-axis fully labelled with units; sensible linear scale so that plots occupy at least half the grid; 8 bars plotted correctly; 12 bars plotted correctly;	**4**
1(b)(iii)	May / June / July / August AND October;	**1**
1(b)(iv)	4;	**1**
1(b)(v)	27 (°C); 60 (m);	**2**

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Question	Answer	Marks
1(b)(vi)	*any four from:* *idea of short-term effect:* reduced / stopped, export; fruits / trees / crops, destroyed; not safe to harvest the fruit; no ships / no transport, for fruit; soil contaminated (with sewerage); *idea of long-term effect:* idea of recovery time; trees need replanting; lower yield of fruits; soil, eroded / washed away; workers, injured / killed; economic impact, e.g. lower income, consumers go elsewhere; damage to infrastructure, e.g. electricity or communications; positive effect of silt deposition / increased soil fertility;	**4**
1(b)(vii)	*any three from:* nowhere to go; couldn't afford to leave; felt safe in, homes / storm shelters; concerned about their property; survived previous storms; didn't appreciate high risk / thought they were well-prepared, e.g. food stores, boarded-up windows; had livestock to look after; too old / infirm, to make the journey; traffic jams prevented evacuation / couldn't get transport; AVP;	**3**

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Question	Answer	Marks
1(b)(viii)	*any three from:* risk of, infectious/bacterial diseases / typhoid / cholera; (clean / drinking) water was contaminated; example of contamination, e.g. salt, sewage / industrial / animal waste; disruption to (potable) water supply / pipes broken / cut-off water supply; people left homeless / homes destroyed; people were, evacuated / in shelters;	**3**
1(c)(i)	difference shown (116.5 – 112.4 = 4.1 million); (4.1 ÷ 112.4 × 100 =) 3.648 (%);	**2**
1(c)(ii)	*any two from:* fear of (more) hurricanes; awareness that, Florida landscape was damaged / sand washed away from beaches; less availability of, hotels / services / tourist attractions / infrastructure; airport damaged / flights cancelled;	**2**
1(d)(i)	*any two from:* quantity / quality, of deposit; geology / accessibility; environmental impact (assessment); economic viability / cost of extraction; supply and demand;	**2**
1(d)(ii)	*any three from:* damages, ecosystem / (marine / land-based) wildlife / habitat; leads to, erosion / loss of fertile land; changes course of rivers / increases flooding; transportation causes damage; named form of pollution qualified, e.g. noise pollution from machinery, atmospheric pollution from dust; AVP, e.g. causes subsidence, loss of biodiversity, damages food chains, could introduce non-native species to a new area;	**3**
1(d)(iii)	*any one from:* sand is extracted at a faster rate than it can be produced naturally; idea of not meeting the needs of future generations; the amount of sand that can be extracted is finite;	**1**

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Question	Answer	Marks
1(d)(iv)	*any two from:* increasing global population / more people; increasing urbanisation / more houses; further example of increasing construction, e.g. infrastructure, road building, factories, reclamation of land;	**2**
1(e)(i)	*any one relevant question, e.g.:* Would you buy one of the new houses?; How many bedrooms / rooms would you want in the house?; Do you own your own house?; Will the local infrastructure support new houses?;	**1**
1(e)(ii)	random number generator to select people from electoral roll or phone book / put names in a bag and pull out sample at random / AVP;	**1**
1(e)(iii)	sample, has no bias / is representative;	**1**
1(e)(iv)	3 cm distance on map; (cannot build because) (1 cm = 20 m so 3 cm =) 60 m;	**2**
1(f)(i)	10;	**1**
1(f)(ii)	*any two from:* to prevent, wildfires / uncontrolled fires; dry, vegetation / ground (which catches fire easily); fire can spread very easily / fire gets out of control quickly;	**2**

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Question	Answer	Marks
1(f)(iii)	*any three from strategies developed:* government action; distributing emergency water supplies; water conservation; rationing; fines for overextraction; hose pipe bans; increase water supply; dams / reservoirs; wells / aquifers; standpipes; desalination; rainwater harvesting; water transfer; international aid, qualified, e.g. funding of development projects; AVP, e.g. drought-resistant crops, stockpiling (of water / crops);	**3**
1(f)(iv)	*any one from:* producing greenhouse gases / named greenhouse gas / climate change / global warming; changes to water cycle / water extraction; deforestation;	**1**

Question	Answer	Marks
2(a)(i)	all the living organisms (biotic components) together with all the non-living (abiotic) components in an area / owtte ;	**1**
2(a)(ii)	*any three from:* loss of biodiversity; genetic depletion; loss of, endangered species / manatee; organisms migrate; disruption of food chain / web; reduction in water levels;	**3**

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Question	Answer	Marks
2(b)	*conclusion based on any five pieces of evidence:* *Everglades protection area / national park:* restricts activities; prevents (unsustainable) development; educates public / raises awareness; *tourists can only take a boat with a guide / or need a permit to hire a boat:* limits tourist numbers; helps prevent harming wildlife; guides know the safe way to drive a boat (without harming wildlife); *signage:* increases awareness of endangered manatees; report injured manatee / helps prevent manatees from becoming more endangered or extinct; organisation that specifically looks after (injured) manatees; *burning of invasive species:* helps native species thrive; evasive / non-native species have few natural competitors so need to be artificially removed; AVP;	**5**
2(c)	*any two from:* introduce / use / be aware of / vote for, laws and regulations; increase / introduce, controls at points of entry; raise awareness of / educate people on, dangers of invasive species; do not release (exotic) pets into the wild; do not import banned animals;	**2**

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Question	Answer	Marks
3(a)	idea of no atmospheric borders / air pollutants can travel, long distances / across countries;	**1**
3(b)(i)	plan **B** representative of whole Everglades (protective) area; plan **A** concentrated in one (small) area so not representative; plan **C** samples only one canal so not representative;	**3**
3(b)(ii)	*any one from:* need more mosquitofish for comparable mass to largemouth bass; mosquito fish are smaller;	**1**
3(b)(iii)	*any three from:* general decrease over time; concentrations (of mercury) higher in largemouth bass than in mosquitofish; highest concentration in year 2 for both fish / owtte; comparison with quoted supporting data;	**3**
3(b)(iv)	*mosquitofish:* 0.031 (ppm); *largemouth bass:* 2.5 (ppm);	**2**
3(b)(v)	*mosquitofish:* yes, as lower than, 1 ppm / recommended amount; *largemouth bass:* no, as greater than 1 ppm;	**2**
3(b)(vi)	*advantage*: fish do not need to be killed / continuous sampling / do not need to catch fish / method is, easier / quicker / less time consuming; *disadvantage*: do not know how mercury (bio)accumulates in flesh / do not know effect on fish / do not know if fish are safe to eat;	**2**
3(c)(i)	5;	**1**
3(c)(ii)	*any two from:* mercury, bioaccumulates / builds up in the food chain; humans are at the top of the food chain; largemouth bass are higher in the food chain than mosquitofish; humans eat largemouth bass; AVP;	**2**

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Question	Answer	Marks
3(c)(iii)	*any two from:* mosquitofish eat mosquito larvae; (female) mosquitoes spread malaria; vector control;	**2**
3(d)	*any four from:* eutrophication; more (aquatic) plants grow / idea of more plants growing; algae blooms form; sunlight prevented from reaching other (aquatic) plants / reduction in photosynthesis; algae / plants, die / decompose ; decomposed by microbes / eq; microbes / decomposers, respire using up oxygen / increased biological oxygen demand / BOD; (*which leads to depletion of oxygen*)	**4**

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