Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **March 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.

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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 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)	5.5 million / 5 500 000;	**1**
1(b)(i)	*any two from:* spread the callipers between the two ends of the shell; hold callipers against ruler; read/record length in mm/cm;	**2**
1(b)(ii)	difficult to do consistently / snail does not stay still / differing amounts of body in or out of shell (at any one time);	**1**
1(c)(i)	correct orientation AND linear scale so plots occupy over half the space available; both axes fully labelled, including unit for length (cm); plots for **A**; plots for **B**;	**4**
1(c)(ii)	straight lines drawn between plots AND labelled;	**1**
1(c)(iii)	**A** AND **B** increase**;** *plus any one from:* **B** (always) higher than **A** / ORA; rate of growth, reaches plateau / less after 16 weeks; sudden growth increase after 12 weeks;	**2**
1(c)(iv)	13 (cm);	**1**
1(c)(v)	**A** 12.5 (cm) AND **B** 19 (cm);	**1**
1(c)(vi)	diet **B** is being tested / diet **B** has the calcium added / diet **A** is normal diet / diet **A** is leaves only;	**1**
1(c)(vii)	(an animal that only) eats plants / producers ;	**1**
1(c)(viii)	to make shell strong/hard/grow faster;	**1**
1(c)(ix)	*any two from:* shells / marine organisms; deposited in layers (on sea bed) / process of sedimentation; pressure applied (to form rock); over long period / millions of years;	**2**

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Question	Answer	Marks
1(d)	*any three from:* high/optimum temperature / range 25–28 °C (all year); high/optimum rainfall / wet / never dry (all year); so plants, grow / photosynthesise (well / all year); so snails can, grow / feed (on plants) (well / all year);	**3**
1(e)(i)	five trees drawn using key; all positioned to block wind, in diagonal line from W to S / half on west edge and half on south edge;	**2**
1(e)(ii)	*any three from:* trees / plants / food for snails can be grown, as needed / locally; snails, can be eaten / are a good source of food / protein / part of a healthy diet; shells can be crushed and used to give calcium to next crop of snails; no air/water pollution; no/little transport needed; snails eat/use up vegetable waste; can be done for, many years / a long time;	**3**
1(f)(i)	use a systematic/random sampling method; further appropriate detail for type of sampling chosen, e.g. by age / socioeconomic status / size of farm / selecting first ten farmers met;	**2**
1(f)(ii)	*any reasonable yes / no question about farming of snails, e.g.:* do you earn good money from selling snails / do you add calcium to the snail diet / do you only sell snails over X cm;	**1**
1(f)(iii)	most families eat snails (regularly); most farmers sell snails in local markets; about half the farmers keep, large numbers of snails / over 1000 snails;	**3**

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Question	Answer	Marks
2(a)	*any two from:* (consistent) wind source available; renewable source of energy; reduce, dependency/need for fossil fuels/nuclear; wind turbines, do not contribute to climate change / carbon neutral; land can still be used for farming / multiple land use; (building) provides employment; provides energy security;	**2**
2(b)(i)	area calculated; correct use of scale, $50 \times 50 = 2500$; km^2;	**3**
2(b)(ii)	*any three from:* oil could be exported rather than, refined / used in Ghana; so very few, jobs / employment opportunities; most money earned by private/international companies; damage to fishing industry; causes/increases risk of, water pollution / oil spill (damaging coastal habitats); built in the Gulf / in the sea / geographically inaccessible / (offshore is) long way from city; expensive to build so less money for government to spend;	**3**
2(b)(iii)	*any four from:* covers, beaches/mangroves with oil; causes, loss of / damage to habitats/coral reefs; covers plants/vegetation / blocks out sunlight; so photosynthesis reduced/blocked; blocks fish gills / suffocates fish; covers bird feathers; so birds can't. fly / feed (leading to death); gets ingested by, marine animals / organisms; and toxic effects lead to, death of organisms / bioaccumulation; causes, disruption of food chains / loss of food sources; reduces <u>biodiversity</u>;	**4**

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Question	Answer	Marks
3(a)(i)	*any two from:* breathing problems, e.g. asthma / bronchitis; lung cancer / reference to carcinogen; lead poisoning / effect of lead poisoning / inhaling toxic gases; burns; eye irritation;	**2**
3(a)(ii)	*any two from:* wind blows smoke (in NE direction / from SW); smoke covers, food markets / food / informal settlement; causes named health risk; smoke covers river; causes water pollution;	**2**
3(b)(i)	too dangerous / taking away job/money from people working the dump / risk of being attacked / dangerous site;	**1**
3(b)(ii)	(75 × 32 ÷ 100 =) 24 (g);	**1**
3(b)(iii)	(48 ÷ 8 =) 6 (m);	**1**
3(b)(iv)	(1000 ÷ 48 =) 20.8 / 21 (m);	**1**
3(c)(i)	*any two from:* there are not many machines; people do not know how to use/repair the machines; buyers pay lower prices for unburnt wires / ORA; the machines are not as fast; the machines break down;	**2**
3(c)(ii)	*any two from:* adds to the existing e-waste dump problems; need to find landfill sites for e-waste / e-waste is non-biodegradable; adds to the health problems of population increases air/water pollution; makes the e-waste problem even harder to, control / regulate;	**2**

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Question	Answer	Marks
3(d)(i)	*any three from:* land saturated; water not held back/absorbed by marshland / fewer plants to absorb water; water not held/stored in lagoon; silt in lagoon/river channel narrowed (overall volume reduced); so water leaves the river/lagoon faster than before / flash floods occur; climate change / more rain than usual;	**3**
3(d)(ii)	*any two from:* toxic substances present / unsuitable pH; no oxygen in the water / high BOD; more bacteria/decomposers in the water; food chains have collapsed;	**2**
3(d)(iii)	*any three from:* properties / businesses / infrastructure, water-damaged; cost of, repairs / replacements; farms/agriculture damaged / food shortages; transport difficulties; reduced, trade / exports / GDP; increased, illness / disease / named disease; medical expenses; people unable to work; loss of, income / unemployment; water supply contaminated; so fresh water must be imported; so no fresh water for industrial processes;	**3**
3(d)(iv)	*any two from:* prevent, litter / waste / untreated sewage entering the river; relocate e-waste dump / stop wire-burning; treat sewage; use, water oxygenation / aeration; introduce water-quality laws; enforce (existing) laws;	**2**

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Question	Answer	Marks
3(d)(v)	*any one from:* not enough money for the drains / high cost of infrastructure; flooding does not last very long / not been a serious problem in the past; displaces people/animals / affects habitats; water pollution will (still) go straight into the sea;	**1**
3(e)(i)	*any five from:* malaria (parasite / plasmodium) carried by (female) mosquitoes / mosquitoes are vector; mosquitoes breed in (stagnant) water; (female) mosquito bites (infected) human; malaria (parasite / plasmodium) (enters and) multiplies/reproduces in mosquito; (female) mosquito bites uninfected human; malaria parasite multiplies/reproduces in human (liver); malaria parasite carried in human blood; AVP, e.g. reference to female / anopheles mosquito;	**5**
3(e)(ii)	*any three from:* break the lifecycle of the, mosquito / malaria parasite; by, vector control / eradication of mosquitoes; kill parasite in human blood; by, using antimalarial drugs / developing vaccinations; stop mosquitoes biting humans; by using insect repellent; by using, (insecticide treated) nets / ITNs; reduce areas for mosquitoes to breed; by draining stagnant water; kill larvae or adult mosquitoes; by biological control of vector, e.g. fish; by spraying areas with <u>insecticide</u>; by place an oil layer over water (suffocate larvae);	**3**

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Question	Answer	Marks
3(f)(i)	*any two from:* fishermen do not want to break the law; gives more time for fish to: grow / become mature; breed / reproduce; repopulate / numbers to increase; so catches will not decline;	**2**
3(f)(ii)	introduce quotas on numbers/mass of fish caught; limit number of fishing days per month / year; control the number of fishing boats; restrict fishing areas / use economic exclusion zones (EEZs) / make international agreements; use small nets; use nets with large meshes; use nets with diamond-shaped meshes (to allow small fish to swim through); use pole and line method; introduce fines (for illegal fishing);	**3**

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