Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/12**

Paper 1 Theory **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.

Cambridge International is publishing the mark schemes for the March 2020 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.

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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)(i)	limestone / sandstone / shale;	**1**
1(a)(ii)	*any two from:* sedimentary rocks, buried / underground; (high) temperature; (high) pressure;	**2**
1(b)	*any two from:* accessibility issue / cost of extraction too high; environmental impact assessment issue; concerns from local residents; too dangerous; (limited) quotas; not one of the (metamorphic) rocks that is (currently) in (high) demand;	**2**

Question	Answer	Marks
2(a)	*any three from:* areas of high population density are unevenly spaced; higher density in coastal areas; majority of high population densities are in northern hemisphere; high density in Europe; eastern side of North America; eastern side of South America; use of data from map, e.g. linear distribution of high population in, NE Africa;	**3**
2(b)	*any two from:* extreme climate, e.g. desert; difficult terrain, e.g. mountainous; (very) remote / poor accessibility; low land fertility; limited availability of water; limited natural resources; lack of jobs; political factors / conflict;	**2**

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Question	Answer	Marks
3(a)(i)	sandy / sand;	**1**
3(a)(ii)	*any two from:* water drains too quickly for roots or plants to absorb; water drains to areas roots or plants cannot reach; plants don't have a chance to use nutrients / leaching of nutrients; farmer needs to irrigate more frequently;	**2**
3(b)	*any two from:* crop rotation; use of fertilisers (to increase, NPK in soil / essential elements for growth); irrigation; use of, insecticide / fungicide / pesticide / biological control; use of, herbicide / weed control; mechanisation; selective breeding (of animals / plants); genetically modified organisms; controlled environments / greenhouses / hydroponics (to extend growing season);	**2**
3(c)	*(list rule applied)* *any two from:* boiling / distillation; chlorination; filtering / reverse osmosis; desalination;	**2**

Question	Answer	Marks
4	core named and labelled; mantle named and labelled; correct representation of three main sections: core, mantle, crust;	**3**

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Question	Answer	Marks
5(a)(i)	algae harmless when wet (under water) / difficult to monitor death in the sea unless fish are washed onto shore;	**1**
5(a)(ii)	*any two from:* visual impact; cannot, access / enjoy the beach; reduced tourism; reduced, food / source of shellfish loss of, income / jobs;	**2**
5(a)(iii)	*any one from:* birds cannot nest; algae covers sand so birds cannot feed; can lead to death of aquatic life;	**1**
5(b)	excessive use of fertilisers; washed off (farm) land (into, sea / lakes / rivers / pond); fertilisers contain, nitrates / phosphates; nutrient enrichment; algae, multiply / grow / increase in numbers quickly;	**5**

Question	Answer	Marks
6(a)	*any three from:* fertile soil; extraction of, minerals / sulfur; availability of geothermal energy; nowhere else to go; family reasons / settled; employment, e.g. in tourism / thermal spas; emergency preparations in place, e.g. early warning systems, drills;	**3**

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Question	Answer	Marks
6(b)	*results:* increased activity / more likely to erupt; *any two reasons from:* increased, number of earthquakes / seismic activity / data support; increased temperature / data support; increased emissions of SO_2 / data support;	**3**
6(c)	*opinion based on logical development of any five pieces of evidence* *examples of evidence for effective strategy:* government investment in disaster prevention (new phone mast); early warning system in place (new mobile phone mast, good phone signal); people have time to escape (exclusion zone around volcano); local awareness / preparation (stock-piling of food, water, medicine); evacuation plans in place / preparation (emergency school drills); *examples of evidence against effective strategy:* lack of awareness in some locals (volcano has never erupted); resistance / lack of readiness, to evacuating (we are safe, grandfather says nothing to worry about, won't leave home); no incentive to move away / loss of income from reduced tourism (used to take tourists up volcano but can't now due to exclusion zone);	**5**
6(d)(i)	acid rain;	**1**
6(d)(ii)	burning fossil fuels / vehicle emissions;	**1**
6(e)(i)	areas of (complete) tree death match (very) high CO_2 levels; trees are not dead where there is normal concentration of CO_2;	**2**
6(e)(ii)	(enhanced) greenhouse effect / global warming;	**1**

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Question	Answer	Marks
7(a)(i)	2 bars correctly plotted; coal production plotted first, and coal consumption plotted second; key shaded correctly;	**3**
7(a)(ii)	*max two for either consumption or production, and three from:* coal production increased then decreased; coal consumption increased and then decreased; consumption and production follow similar trend; except in 2014 when consumption dropped; 2013 max for coal produced / 2015 max for coal consumed; more coal consumed than produced;	**3**
7(a)(iii)	(yes because) coal consumption greater than coal production;	**1**
7(a)(iv)	*any two from:* increasing human population; domestic demand; industrial demand; personal/national wealth; transport; climate; natural hazards; political / conflict;	**2**
7(b)	*any three from:* (300–400) millions of years ago; formed from, dead/decaying trees / plant material; remains covered by, mud / sediment; becomes, peat / lignite; increased temperature and pressure; chemically altered;	**3**
7(c)(i)	biofuel / bioethanol / biogas / wood / geothermal / hydro-electric / tidal / solar / wind;	**1**

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Question	Answer	Marks
7(c)(ii)	*any two from:* land-locked / not near the sea; waves are not big/powerful enough; lack of money to invest in non-renewables; have readily available other sources of energy; lack of, political interest / environmental opposition;	**2**
7(d)	(1.379 – 1.331 =) 0.048; (0.048 ÷ 1.331 × 100 =) 3.6 / 3.61 (%);	**2**
7(e)(i)	concern over population growth / population growing too fast / high reproductive potential of young people; pyramid has a high percentage of young dependants / about 40% people under 20 / quoted data;	**2**
7(e)(ii)	*any two from:* 20–49 includes those born, in preceding 49 years / prior to 1979 / before OCP / when there was a high birth rate; those children are now in 20–49 age group; 2015 has lower percentage of 0–19 because the OCP was introduced (in 1979);	**2**
7(e)(iii)	upside down pyramid / bigger at top than bottom / V-shaped; *plus any two from:* high(er) proportion of population is, older / over 60; small(est) % below 20 years old; equal proportion of males and females (up to 69); proportion of females outnumber males in older groups; proportion of males outnumber females in 30-39; quoted data;	**3**
7(e)(iv)	(the 0–29 age groups are approximately the same size, so) the birth rate is, (approximately) the same / stable;	**1**
7(e)(v)	*any two from:* change in attitude to having children; new national policy; war / change in migration; example of a natural disaster / crop failure / disease; medical advances;	**2**

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Question	Answer	Marks
7(e)(vi)	*any two from:* family planning; education on contraception; availability of contraception; improved health education; improved education of women / careers for women;	**2**

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Question	Answer	Marks
8	*Level of response marked question:* Level 3 [5–6 marks] A coherent response is given that develops and supports the candidate's conclusion using relevant details and examples. Indicative content and subject-specific vocabulary are generally used precisely and accurately. Good responses are likely to present a balanced evaluation of the statement. Level 2 [3–4 marks] Development and support of the conclusion is evident, though the response may lack some coherence and/or detail. Irrelevant detail may be present. Indicative content and subject-specific vocabulary are used but may lack some precision and/or accuracy. Responses contain evaluation of the statement, but this may not be balanced. Level 1 [1–2 marks] The response may be limited in development and/or support. Contradictions and/or irrelevant detail may be present. Indicative content and subject-specific vocabulary may be limited or absent. Responses may lack structure or be in the form of a list. Evaluation may be limited or absent. No response or no creditable response [0 marks]	**6**

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Question	Answer	Marks
8	*Indicative content for:* 'Zoos and captive breeding programmes are the best way of conserving biodiversity' *(agree):* Zoos and captive breeding programmes… • keep species safe and well • protect species from competition / predation / extinction • provide medical care • monitor the gene pool of species / prevent inbreeding / ensure genetic variation • allow reintroduction of species into wild • raise money by charging visitors • promote sustainable tourism and ecotourism • provide education opportunities *(do not agree):* Zoos and captive breeding programmes… • exploit animals, are morally/ethically wrong • cannot always provide natural habitats • limit the gene pool of species (due to limited breeding stock/opportunities) • make it difficult to reintroduce species into wild / cause behavioural changes • are not as good as other strategies, e.g. national parks, wildlife ecological reserves and corridors, extractive reserves, world biosphere reserves	

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