Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/13**

Paper 1 Theory **May/June 2022**

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 May/June 2022 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U 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.
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)	*any two from:* to hold / capture / store water / keep(in the field); to collect surface run-off; / rainwater; irrigation/ to increase water infiltration / absorption; to prevent soil erosion / plant / minerals being washed away;	**2**
1(b)	*any one from:* idea of raising up the soil e.g. ridge / line / mound; built along contour lines;	**1**
1(c)	*any one from:* hard physical work; time-consuming; needs to be maintained;	**1**

Question	Answer	Marks
2(a)	3.0 ;	**1**
2(b)	*any two from:* aquifers; lakes; wells; rivers; reservoirs; rainfall; oasis; desalination plants;	**2**

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Question	Answer	Marks
2(c)	*any three from:* **reduce due to:** greater consumption (by people) ; (used by) industry / domestic; pollution of water sources; global warming / temperature rise / greater evaporation; climate change / less rainfall / drought; **increase due to:** technological advances; glaciers / ice sheet / permafrost melting;	**3**

Question	Answer	Marks
3(a)	boom (ends) connected to / towed by boats; boom, surrounds / collects / traps, oil spill;	**2**
3(b)	*any two from:* skimmers; dispersants / detergent;	**2**
3(c)	*any one from:* coats feathers so, unable to fly / may sink / cannot retain heat; disruption to the food chain / web; death / poisoning / kills if eaten;	**1**

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Question	Answer	Marks
4(a)	transportation; deposition; sedimentation;	**3**
4(b)	shale / limestone / sandstone; AVP	**1**
4(c)	layered / contains (rounded) grains / may contain fossils;	**1**

Question	Answer	Marks
5(a)	*any two from:* transport; tourism; source of, chemicals / building materials / minerals; desalination for fresh water;	**2**
5(b)	*any three from:* difference in water level causes water to flow; flow of water causes turbine to spin; (turbine) drives a generator; converts kinetic energy to electrical energy / electricity; works in both directions / as tide comes in AND as tide goes out;	**3**
5(c)(i)	bar chart completed correctly to 410 GWh;	**1**
5(c)(ii)	2017;	**1**
5(d)(i)	*any one from:* predictable / consistent / not weather dependent; (machine / barrage has) long life span; low running cost;	**1**

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Question	Answer	Marks
5(d)(ii)	*any developed impact for two marks, e.g.:* floods mudflats; which causes erosion; disrupts food chains; results in habitat loss / change; disrupts tidal flow / acts as a barrier; which restricts fish spawning / migration; causes collision risk ; disrupts food chains; increases siltation; so less light for photosynthesis by aquatic plants; results in habitat loss / change; AVP;;	**2**

Question	Answer	Marks
6(a)(i)	*any three from:* houses / factories / vehicles, emit pollutants / gases; winter / low sun provides less warmth to Earth's surface; (temperature) inversion / warm air layer, holds cold air near ground; cold air is denser and unable to rise; pollutants trapped (by the inversion); mountains and valleys increase strength of inversion;	**3**
6(a)(ii)	*any two from:* volatile organic compounds / (VOC); sulphur oxides; carbon monoxide; smoke / soot / particulate matter; ozone;	**2**

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Question	Answer	Marks
6(b)	*any three from:* encourage use of public transport / cycles / walk; encourage use of electric vehicles; introduce taxation of fuels / lower tax on alternative transport ; (introduce / use legislation) to have vehicle emissions filters / regular testing; introduce / use congestion charges / pedestrian zones; encourage people to work at home;	**3**
6(c)(i)	0.56;	**1**
6(c)(ii)	*any three from:* 1900 to 1939 below average; 1900 to 1939 decreased then increased; 1940 to 1976 fluctuating; 1977 to 2000 above average; 1977 to 2000 increasing; overall increase in temp;	**3**
6(c)(iii)	*any four from:* higher temperature means: longer growing season; faster growth rate of plants; crops can be grown in higher latitudes / at greater altitude; plants preferring cool climates will have less geographic range; regional change in type of plants grown; melting of ice / glaciers / permafrost (meaning rise of sea-level); causing flooding and loss of agricultural land; faster evaporation; causing water shortages / drought; changes in atmospheric circulation / weather patterns; some areas too dry for / limits agriculture; some areas become too hot for / limits / reduces agriculture; favourable conditions for increase in pests; favourable conditions for increase in diseases;	**4**

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Question	Answer	Marks
7(a)(i)	between 5 ° and 20 ° north and south of the Equator / between tropics; *any two from:* North of the Equator in the Atlantic Ocean; in the Indian Ocean; in the Pacific Ocean; north of Australia; AVP;	**3**
7(a)(ii)	(surface) temperature of (at least) 27 °C; depth of (at least) 60 m;	**2**
7(b)	2 ÷ 6 × 100; 33(.3 %);	**2**
7(c)(i)	*any three from:* flooding; loss of life / injury; financial losses / loss of jobs / employment; damage to buildings / infrastructure; loss of crops / livestock; loss of habitats; water-related disease / unsafe water / contaminated water;	**3**
7(c)(ii)	*any three from:* monitoring / early warning to allow for; evacuation plans; (preparation of emergency) shelters; stockpiling of supplies / food / water / electricity generators; (preparation of) rescue teams; (preparation of) medical teams / supplies / support; design of buildings / infrastructure, to withstand high winds / floods / storm surges; establishing communications; involvement of international aid agencies;	**3**

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Question	Answer	Marks
8(a)(i)	column or row headings: year, area; unit for area / km^2 in heading; four sets of area data recorded;	**3**
8(a)(ii)	*any three from:* right to follow traditional practices / way of life; continue fishing / hunting / gathering / farming; preserve their culture and way of life; prevent destruction of their environment / area e.g. deforestation; can live where ancestors lived ; reduce risk of infection from outside contact;	**3**
8(b)	*any three from:* idea of: different amounts of human activity allowed in each zone; **Core area:** monitoring / research activities / no settlements / protect the ecosystem; **Buffer zone**: controlled / limited access for people / eco-tourism / recreation / research, / education and training / some limited settlements / local tribes / communities ; **Transition area**: research / tourism / recreation / greater settlements / controlled human activities e.g. sustainable farming;	**3**

Question	Answer	Marks
9(a)(i)	Africa;	**1**
9(a)(ii)	(population) decreased; (because average annual percentage population growth) rate was, negative / –3 to –0.1;	**2**
9(b)	*any one from:* greater use / availability of contraception; more awareness of family planning; women focus more on education / career (and so have children later in life); people get married later in life; high cost of raising children;	**1**

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Question	Answer	Marks
9(c)	*any two from:* economic migration: find work / employment; better standards of living / quality of life; better services / hospitals ; better education; poverty; environmental migration: natural disasters / flood / drought / earthquake; famine / crop failure; better climate; political migration: war / conflict / unrest; high crime rate; (religious) persecution; social migration: family ties;	**2**

Question	Answer	Marks
9(d)	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] *indicative content for:* A one-child policy is the best way to manage population size. *agree:* simple, straightforward easy to manage more freedom for women better education for female children financial benefits for family state benefits given: extra land, free homes irrigation higher pensions cheap loans	**6**

Question	Answer	Marks
9(d)	better government jobs priority service at hospital subsidised education longer maternity leave more jobs became available more food became available more housing available more land available *disagree:* creates mandatory contraception and sterilisation creates gender imbalance emphasis on boys / abandonment of girls increase in orphanages mainly for girls difficult to enforce in rural communities elderly had less support young have large burden of care for ageing parents severe penalties: large fines property seized jail applied inconsistently: government officials wealthy can be exceptions: rural families allowed two children some ethnic minorities allowed three children birth defects learning disabilities unexpected tragedies Twins / multiple births both parents from only child households financial burden for government tin administration	

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Question	Answer	Marks
9(d)	other strategies might be better e.g. two-children policy still results in population decrease	

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