Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/13**

Paper 1 Theory **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.

Cambridge International is publishing the mark schemes for the October/November 2020 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)(i)	*any three from:* MEDC low(er) birth rate / LEDC high(er) birth rate; availability of contraceptives; MEDC low(er) death rate / LEDC high(er) death rate; MEDC long(er) life expectancy / LEDC low(er) life expectancy; MEDC more elderly dependents / LEDC more younger dependents; availability of health care; availability of nutritious food; availability of clean safe water;	**3**
1(a)(ii)	fewer males than females in each age group / ORA; same trend / percentage decreases with age for both males and females;	**2**
1(b)	*any one from:* increased cost of health care; increased cost of pensions; increase in (elderly) dependency; smaller working population; fewer people paying (income) tax; increased knowledge base;	**1**

Question	Answer	Marks
2(a)	storm surges / tsunamis / snowmelt / land relief / saturated soil / compacted soil / deforestation / cultivation / urbanisation / rise in sea level / climate change;	**1**
2(b)	*any one positive effect:* deposition of silt on farmland / increased fertility of soil; idea of benefits of planned flooding, e.g. reservoir / HEP; *any one negative effect:* loss of, life / livestock / crops; damage to, buildings / infrastructure; contamination of water / water-related disease; financial loss;	**2**

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Question	Answer	Marks
2(c)	*any two from:* provision of medical services; provision of, clean water / food; training of emergency response teams; financial help / overseas aid; rescue; shelters; rebuilding of damaged areas;	**2**

Question	Answer	Marks
3(a)	opencast / open-pit / open-cut / strip mining;	**1**
3(b)	*any three from:* filling the hole (with soil or water); soil improvement; bioremediation; tree planting;	**3**

Question	Answer	Marks
4(a)	typhoid; cholera;	**2**
4(b)	domestic waste / sewage / animal waste;	**1**
4(c)	*any two from:* chlorination; boiling; filtration; improved sanitation; treatment of sewage; (water) pollution control; legislation;	**2**

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Question	Answer	Marks
5(a)(i)	*any three from:* high energy output; existing, technology / buildings; easy to transport; reliable / continuous, supply; existing knowledge base;	**3**
5(a)(ii)	*any two from:* biofuels; geothermal; hydroelectric power / HEP; tidal; wave; solar; wind;	**2**
5(b)(i)	Italy; (range = 73.3 – 55.5 =) 17.8 (%);	**2**
5(b)(ii)	MEDCs overall higher / ORA; *plus any two from:* MEDCs decreasing; LEDCs increasing (except Costa Rica) / no clear trend; suitable quoted data;	**3**

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Question	Answer	Marks
6(a)(i)	*any two conditions from:* temperature; humidity; amount of, water / irrigation; amount of carbon dioxide; amount of pests; light intensity; day length; *any two corresponding benefits from:* non-native / wider / specific, variety of plants can be grown; longer growing season; don't need to use (as much) pesticide; increase in photosynthesis, explained; AVP;	**4**
6(a)(ii)	cost / need for, maintenance / heating / lighting / construction;	**1**

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Question	Answer	Marks
6(b)	*max 5 for points made from comment bubbles:* *should be increased:* increase yield / can be grown faster / can survive harsher conditions; makes farmers more money / means fewer food shortages; food production must double in next 35 years / growing world population; area of farmland is decreasing / GM crops increase yields and get more food from the land; *should not be increased:* GM crop seeds are expensive / only large companies can afford them; small commercial farms are going out of business; serious risk to the environment; cross-pollination creates herbicide-resistant weeds that compete with other crops and wild plants / can have an impact on food chains; *max 5 for candidate's own valid points:* *additional examples for should be increased:* improved living standards; less land required for growing crops / land can be used for other things; can use land that is currently too harsh for crops / named example; reduced use of, pesticides / insecticide / fungicides; improved nutritional qualities of food / named example e.g. golden rice; *additional examples for should not be increased:* long-term effects on environment; (long-term) impact on human health not known; not ethical; have to buy new GM seeds for each crop (from specific suppliers);	**7**

Question	Answer	Marks
7(a)(i)	*any three from:* sulfur dioxide (SO_2) / oxides of nitrogen (NOx); from, combustion of fossil fuels / high temperature in an engine; released into, atmosphere / air; react with water (to form acid rain);	**3**

Question	Answer	Marks
7(a)(ii)	*any three from:* acidification of bodies of water; effects on, fish populations / aquatic life; damage to, crops / vegetation; damage to, buildings / rocks;	**3**
7(b)(i)	bar correctly plotted (at 350 ppm);	**1**
7(b)(ii)	2005–2015;	**1**
7(b)(iii)	*any one from:* population is increasing; (increased) use of, fossil fuels / motor vehicles; (increased) deforestation;	**1**
7(c)	*any three from:* reduction in use of fossil fuels; increased use of low-carbon energy resources; improved energy efficiency; reduce use of motor vehicles / other transport polices; international agreements and policies; taxation; carbon capture and storage; reforestation / afforestation;	**3**
7(d)	*any three from:* increasing temperature / greater temperature extremes; drought; extreme weather; wild fires; melting of, ice sheets / glaciers / permafrost; rise of sea-level; flooding / loss, of land;	**3**

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Question	Answer	Marks
8(a)(i)	671;	**1**
8(a)(ii)	11(.2);	**1**
8(a)(iii)	6.1(3);	**1**
8(a)(iv)	*any two from:* government policy change; site no longer meets criteria; lack of finance; voluntarily withdrawn; land needed for other uses;	**2**
8(a)(v)	*y*-axis label: number of (biosphere) reserves (in 2017) ; *x*-axis label: world region AND letters; sensible linear scale, with plotted points using at least half the grid; bars plotted correctly;	**4**
8(b)	*any two from;* national parks; wilderness area; national forest; wildlife refuge; ecological reserves; extractive reserves; (wildlife / ecological) corridors;	**2**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>9(a)(i)</td><td>any three from:
(in an El Niño year):
no upwelling of cold water (along the coast) / warm current offshore / water warmer than in a neutral year;
so reduced nutrient content (of water);
so less food for fish population;
so fish migrate / feed elsewhere;
so lower number of fish caught;</td><td>3</td></tr>
<tr><td>9(a)(ii)</td><td>table drawn;
column / row, headings and units;
three sets of data recorded correctly;

<table>
<tr><td>year</td><td>increase in (average surface) temperature (of the Pacific Ocean in an El Niño year) / °C</td></tr>
<tr><td>1982</td><td>1.0</td></tr>
<tr><td>1987</td><td>1.3</td></tr>
<tr><td>2015</td><td>1.5</td></tr>
</table>
</td><td>3</td></tr>
</table>

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Question	Answer	Marks
9(b)	*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. 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**

Question	Answer	Marks
9(b)	*Indicative content for:* *'There is no need for countries to monitor the ENSO phenomenon because nothing can stop it from happening.'* *reasons for monitoring include:* cannot predict in other ways / not regular pattern (of years) countries have early warning can prepare for effects of flooding, drought, other weather, etc. e.g. evacuation plans, drills, emergency supplies, emergency teams fishermen have advance notice can, fish elsewhere / follow fish / adjust fishing patterns / do other work can learn more about, El Niño / weather patterns in general may produce additional benefits *reasons for not monitoring include:* waste of, time / money, as it cannot be stopped time / money, could be spent on, preventing / reducing, effects of El Niño investing in flood, relief / protection, e.g. flood barriers, structure of buildings, dredging of rivers, etc. investing in drought relief / protection, e.g. dams, reservoirs, wells, transport lines for bottle distribution, piped water systems, etc. monitoring equipment is expensive to maintain difficult to interpret data / data not always 100% reliable lack of coordination amongst countries that do monitor	

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