Cambridge Assessment International Education

# Cambridge IGCSE™

**ENVIRONMENTAL MANAGEMENT** **0680/13**

Paper 1 Theory **May/June 2020**

MARK SCHEME

Maximum Mark: 80

**Published**

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.



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**[Turn over**

**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:<br><br>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:<br><br>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.

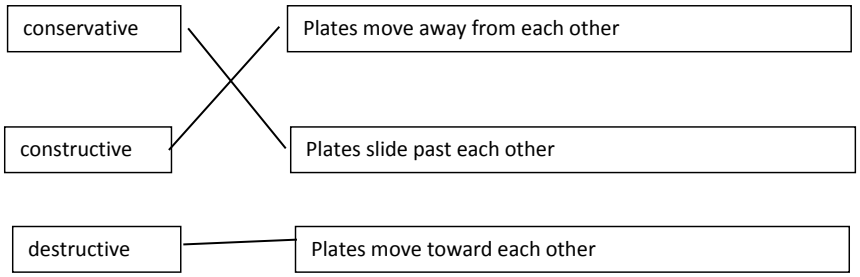
Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

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) |  | **2** |
| 1(b) | *any three from:*<br>distance (from epicentre) to towns/cities;<br>areas of low population density;<br>quality of buildings / able to withstand damage;<br>availability of emergency services in affected area;<br>availability of drinking water / prevention of disease in affected area; | **3** |

| Question | Answer | Marks |
|---|---|---|
| 2(a) | *any three from:*<br>caused by bacteria / a bacterium;<br>person infected with bacterium;<br>sewage from infected person leaked into water supply;<br>water supply contaminated;<br>people drink contaminated water; | **3** |
| 2(b) | *any three from:*<br>provision of safe water, e.g. boreholes / (sealed / pumped) wells;<br>building of pipes from rivers / urban areas to rural areas;<br>provision of bottled water;<br>promotion of rainwater harvesting;<br>water treatment / use of chlorinated water;<br>sanitation systems / sewage treatment;<br>education regarding sanitation;<br>fines / legislation, against water pollution; | **3** |

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| Question | Answer | Marks |
|---|---|---|
| 3(a) | 20 (million tonnes); | **1** |
| 3(b) | *any two from:*<br>increasing human population;<br>increasing affluence / change of diet;<br>lack of availability of other forms of, food / protein; | **2** |
| 3(c) | *any two from:*<br>current stocks are overfished / less to catch;<br>legislation / quotas;<br>use of more sustainable methods;<br>cost of farmed fish cheaper;<br>water pollution;<br>fish populations cannot, recover / stabilise;<br>habitat destruction;<br>climate change;<br>reduced food for fish; | **2** |
| 3(d) | $140 / 220 \times 100$;<br>64(%); | **2** |
| 3(e) | *any two from:*<br>fish easier to catch;<br>management / growth of fish more controlled;<br>health of fish is managed;<br>higher energy conversion rate from food (as restricted movement);<br>less predation;<br>control of disease;<br>less risk to (human) life;<br>no / reduced, by-catch; | **2** |

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| Question | Answer | Marks |
|---|---|---|
| 4(a) | *any three from:*<br>increase in number of wildlife reserves;<br>bamboo forests saved / habitat retained;<br>pandas have reliable source of food;<br>hunting not permitted (in the reserve);<br>better understanding of pandas' needs / education regarding pandas; | **3** |
| 4(b)(i) | *any three from:*<br>use grid map of the area;<br>select a (random) starting point;<br>choose further grid points / samples at uniform intervals;<br>use a valid method, e.g. draw a transect along a map;<br>count number of pandas (at each point);<br>calculate population number from these samples; | **3** |
| 4(b)(ii) | $1864 \times 20 / 100 = 373$;<br>$(373 + 1864 =)$ 2237; | **2** |
| 4(c) | *any three from:*<br>retains the bamboo forest;<br>allows habitat for other animals;<br>panda droppings spread seeds to other areas;<br>public awareness of pandas might increase awareness of other animals;<br>provides protection from hunting for other animals living in the reserve;<br>retains the food web; | **3** |
| 4(d)(i) | $375 + 1864 / 2239$;<br>$(375 \div 2239 \times 100 =)$ 16.7; | **2** |
| 4(d)(ii) | (pandas live longer in captivity because)<br>*any two from:*<br>better diet / controlled diet / plentiful food supply;<br>continuous supply of food;<br>access to medical care;<br>no natural predators;<br>no hunting / poaching; | **2** |

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| Question | Answer | Marks |
|---|---|---|
| 5(a)(i) | three correct plots;<br>plots joined with dashed line; | **2** |
| 5(a)(ii) | negative sign (–) **and** 72 / or 72 decrease; | **1** |
| 5(a)(iii) | *any two from:*<br>increased;<br>by 58% (overall);<br>gradient increases after 1995;<br>then linear increase; | **2** |
| 5(a)(iv) | *any one from:*<br>more raw materials to be transported;<br>more products to be transported;<br>more businesses so more travelling (between them);<br>more money to buy vehicles / vehicles (more) affordable / fuel inexpensive; | **1** |
| 5(b) | *any four from:*<br>use of, less polluting technologies / renewable energy / examples;<br>less use of coal:<br>use of catalytic converters on cars / switch to hybrid cars / electric cars / hydrogen fuel cells;<br>scrubbers for factory chimneys;<br>change in the type of industries within the country;<br>invest / increase, in use of public transport, e.g. trains, buses;<br>recycling;<br>improvements to virtual networks / connectivity, enabling fewer face-to-face meetings; | **4** |

| Question | Answer | Marks |
|---|---|---|
| 6(a)(i) | *bars plotted at correct height:* 80 000 **and** 200 000;<br>key correct; | **2** |
| 6(a)(ii) | garden; | **1** |
| 6(a)(iii) | iron and steel; | **1** |

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| Question | Answer | Marks |
|---|---|---|
| 6(b) | *any two from:*<br>risk of leaching of nutrients into soil water;<br>methane (produced on decomposition) is a greenhouse gas;<br>use of land to produce the food / deforestation / habitat loss;<br>more fertiliser / pesticides needed;<br>use of fossils fuels for production / transportation;<br>more land needed (for landfills) / landfills full;<br>pest control needed / attracts vermin; | **2** |
| 6(c) | *any two from:*<br>sale of composted material (soil improvement or fertiliser);<br>methane from composting / use as a biofuel / burning of waste to produce heat;<br>foodstuffs for animals; | **2** |
| 6(d) | *any three from:*<br>introduce / increase, legislation / fines;<br>provide easier collection / separate (waste) bins;<br>provide more, collection bins / recycling centres / places to dispose of recycling;<br>increase frequency of collection;<br>improve environmental awareness;<br>improve labelling on packaging;<br>encourage use of recyclable packaging;<br>tax waste disposal to landfill; | **3** |

| Question | Answer | Marks |
|---|---|---|
| 7(a)(i) | arable;<br>commercial; | **2** |
| 7(a)(ii) | *any two from:*<br>lack of vegetation / no roots to hold soil;<br>so rainfall washes soil away;<br>no windbreaks;<br>so (dry) soil is blown away; | **2** |

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| Question | Answer | Marks |
|---|---|---|
| 7(b) | *any five from:*<br>organic fertiliser (crop residue, manure);<br>managed grazing (livestock rotation);<br>use of pest-resistant and drought-resistant crops / resistant varieties of crops;<br>trickle drip irrigation;<br>rainwater harvesting;<br>only growing crops to meet needs / not growing cash crops;<br>AVP; | **5** |

| Question | Answer | Marks |
|---|---|---|
| 8(a)(i) | *any two from:*<br>in (far) north(west) / Alaska;<br>in centre (of continent);<br>in the east / southeast;<br>around southeast coast / Gulf of Mexico;<br>small reserve on west coast; | **2** |
| 8(a)(ii) | *any four from:*<br>hole / shaft drilled;<br>to the shale rock;<br>water or sand or chemicals pumped into rock;<br>under pressure;<br>rock fractures;<br>releases gas / oil to pass to surface; | **4** |

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| Question | Answer | Marks |
|---|---|---|
| 8(a)(iii) | *any three from:*<br>chemicals from fracking might enter water sources;<br>process uses a lot of water (supply issues for drinking);<br>risk of earth tremors linked to changes in rock structure;<br>risk of subsidence / sink holes;<br>long term impact not known / eq.;<br>clearance of land in area for fracking / loss of habitat;<br>noise, land, air, visual pollution;<br>impact of waste; | **3** |
| 8(b) | *Level of response marked question:*<br><br>Level 3 [5–6 marks]<br>A coherent response is given that develops and supports the candidate's conclusion using relevant details and examples.<br>Indicative content and subject-specific vocabulary are generally used precisely and accurately.<br>Good responses are likely to present a balanced evaluation of the statement.<br><br>Level 2 [3–4 marks]<br>Development and support of the conclusion is evident, though the response may lack some coherence and/or detail.<br>Indicative content and subject-specific vocabulary are used but may lack some precision and/or accuracy. Irrelevant detail may be present.<br>Responses contain evaluation of the statement, but this may not be balanced.<br><br>Level 1 [1–2 marks]<br>The response may be limited in development and/or support. Contradictions and/or irrelevant detail may be present.<br>Indicative content and subject-specific vocabulary may be limited or absent.<br>Responses may lack structure or be in the form of a list. Evaluation may be limited or absent.<br><br>No response or no creditable response [0 marks]<br><br>*Indicative content for:*<br>'Modern technology will allow the world to produce all the energy it needs without using fossil fuels and other non-renewable sources' | **6** |

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| Question | Answer | Marks |
|---|---|---|
| 8(b) | *agree:*<br>renewable sources are unlimited - increased investment would mean increased use<br>technology has improved, more efficient now, will improve more in future<br>there will be greater investment in education and technology in the future<br>renewables do not produce (as much) greenhouse gases / air pollution<br>increased global legislation / desire to divest from fossil fuels and non-renewables, maybe driven by climate change<br>many renewables are relatively inexpensive once installed<br>examples of renewable resources, e.g. solar, wind, HEP, geothermal<br>use of a combination of renewable technologies will allow for the use of energy at unfavourable times<br>candidates may cover switch to hybrid cars, hydrogen buses, electric trains (rather than petrol and diesel)<br><br>*do not agree*:<br>many renewables are weather/ climate dependent and cannot provide a constant supply<br>some areas cannot afford / do not have the technology<br>convenience of fossil fuels<br>many systems currently rely on nuclear as a back -up, although long life resources are finite<br>human population is increasing, demand for energy growing (lifestyle improvements, industry, infrastructure)<br>difficult to increase generation capacity to replace non-renewables and meet this need<br>many non-renewable sources are cheaper and therefore more economic to use | |

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