Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

ENVIRONMENTAL MANAGEMENT **0680/13**

Paper 1 Theory **October/November 2019**

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 2019 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.

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Question	Answer	Marks
1(a)	gases; oxygen; troposphere; decreases;	**4**
1(b)	*any three from:* makes the soil acidic; reduces growth of plants / defoliation; harmful to organisms growing in the soil; disruption to food webs; damage to buildings; acidify water sources; harmful to aquatic life;	**3**

Question	Answer	Marks
2(a)	opencast / open-pit / open-cut / surface mining;	**1**
2(b)	*any two from:* increase efficiency in extraction; increase efficiency in processing; increase efficiency in use; legislation; recycling; use alternatives;	**2**
2(c)	*any three from:* more employment / less unemployment; raw materials can be used by industry; improvement to, balance of payments / country wealth / GDP; reliable supply of the raw material; improvements in facilities and infrastructure, e.g. roads; increased, export opportunities / trade opportunities / international relationships; increased wealth means higher standard of living;	**3**

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Question	Answer	Marks
3(a)	*any three from:* less permeable surfaces / less infiltration; (therefore) greater surface run-off; (fewer trees or vegetation) less interception; (fewer trees or vegetation) less transpiration; less availability of (undeveloped) flood plains; insufficient infrastructure to handle excessive water (drains);	**3**
3(b)	*any three from:* MEDC might have, better planned drainage / set up emergency drainage; less unauthorised building in MEDC; housing built to better standard in MEDC; better emergency response systems in MEDC; better monitoring / early warning systems / evacuation procedures / plan, in MEDC; better healthcare in MEDC;	**3**
3(c)	deposits silt / deposits are fertile (good for farming) / improved irrigation (from stored flood water) / restores wetlands;	**1**

Question	Answer	Marks
4(a)	*any three from:* water (from reservoir) flows; through, intake / dam / power station; causes turbine to rotate; turns the generator (electricity produced);	**3**
4(b)(i)	400 000 (households);	**1**
4(b)(ii)	*any two from:* employment opportunities (construction or working at power station); supply of goods or services to workers; less power-outages / reliable supply; improvement to local infrastructure; the reservoir provides, fishing / tourism;	**2**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(b)(iii)</td><td>any two from:
loss of farmland;
loss of employment;
negative impact on local wildlife / loss of, woodland / green spaces;
change to water supply downstream;
aesthetic impact on area;
towns / villages / communities, need to be relocated;</td><td>2</td></tr>
<tr><td>4(c)(i)</td><td>
<table>
<tr><th>energy resource</th><th>fossil fuel</th><th>renewable resource</th></tr>
<tr><td>coal</td><td>✓(given)</td><td></td></tr>
<tr><td>wind</td><td></td><td>✓</td></tr>
<tr><td>biomass</td><td></td><td>✓</td></tr>
<tr><td>natural gas</td><td>✓</td><td></td></tr>
<tr><td>hydro-electric</td><td></td><td>✓</td></tr>
<tr><td>solar</td><td></td><td>✓</td></tr>
<tr><td>geothermal</td><td></td><td>✓</td></tr>
</table>
;</td><td>1</td></tr>
<tr><td>4(c)(ii)</td><td>any three from:
average fossil fuels cost more expensive than renewable sources (0.098 : 0.074) / renewables generally cheaper;
most expensive is coal (0.120 USD per kWh);
least expensive is geothermal (0.050 USD per kWh);
wind / biomass, most expensive renewables / compared to fossil fuels;
comparative use of relevant data;</td><td>3</td></tr>
</table>

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Question	Answer	Marks
5(a)	67 / 67.4;	**1**
5(b)	*any two from:* more jobs (growing, packing or exporting soybeans); increase, income / exports of soybeans; higher yields mean less need to import other foods; country more self-sufficient / better food security; less money spent on herbicides; technology / expertise, in GM production could be sold to other countries;	**2**
5(c)	*any one from:* use herbicides; mechanical controls / hoeing / remove by hand; mulching;	**1**
5(d)(i)	84(.0);	**1**
5(d)(ii)	*any two from:* increases up to 2009; decreases, 2010 / 2011; large increase / fluctuates, 2010–2015; stable / similar, 2014 and 2015; comparative use of relevant data; overall increase from 2002 to 2015;	**2**

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Question	Answer	Marks
5(e)	*critical discussion of the advantages and disadvantages (both must be covered for maximum marks):* *advantages:* higher yields from lower inputs; less area needed to produce a crop; less use of insecticides which impact the environment; crops can be made resistant to, drought / pests / insect damage / salinity / look more appealing / have longer shelf-life; *disadvantages:* risk of GM characteristics (such as herbicide resistance) getting into other plants; reduction in crop genetic diversity; unproven technology may have long-term (unknown) environmental effects; impacts on non-target species; increase in herbicide use (on resistant crops) may have toxic effect in local ecosystem;	**5**

Question	Answer	Marks
6(a)	<table><tr><th>process</th><th>letter</th></tr><tr><td>combustion</td><td>A</td></tr><tr><td>death</td><td>C</td></tr><tr><td>respiration</td><td>B</td></tr></table> ;; *all 3 correct [2]* *1–2 correct [1]*	**2**
6(b)(i)	(*reactants*) carbon dioxide + water; (*products*) glucose + oxygen;	**2**

Question	Answer	Marks
6(b)(ii)	*any two from:* captures light energy (from the Sun); converts light energy into chemical energy; energy needed for photosynthesis to occur;	**2**
6(c)	*any two from:* loss of, habitat / biodiversity; disruption to food webs (due to changes in organism numbers); impact on water cycle / changes to rainfall; risk of soil erosion; increase in global temperatures; availability of food for humans; causing, migration / displacement;	**2**
6(d)(i)	plotting ;; *all 7 plots correct [2]* *5–6 plots correct [1]* using key to join points with solid line;	**3**
6(d)(ii)	Cambodia;	**1**
6(d)(iii)	72.8 / 73; (*if answer incorrect allow one mark for,* 4960 – 2870 or 2090 [1]);	**2**
6(d)(iv)	area of trees **not** uprooted or damaged: 744 km^2 ; expected year for damaged trees to have re-grown: 2032 ;	**2**

Question	Answer	Marks
7(a)	*any three from:* majority of world will be water-poor; Northern hemisphere is more water-rich; more water-rich, north of Tropic of Cancer / North America / Europe / North Asia; only water-rich areas in southern hemisphere are in South America; all of Africa / Oceania are water-poor;	**3**
7(b)	*any three from:* demand for use is greater than available water supply; extraction rate greater than replacement rate; (long-term) drought; limited precipitation; reasons for water scarcity, e.g. water cannot be made available to the country; unable to capture precipitation if in large volume at one time; water might be frozen; economic reasons; rocks in country may be impermeable so, no groundwater / no recharging / geological reasons; geographical reasons;	**3**

Question	Answer	Marks
8(a)	58.9 / 59(.0);	**1**
8(b)	any two from: *(actual catch in 2015 was less than the allowable catch therefore)* tuna will be more numerous / increased amount to catch; more juveniles; may grow larger / to greater maturity; increased numbers to breed;	**2**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>8(c)(i)</td><td>X axis labelled;
Y axis appropriate linear scale and labelled and units;
plotting;;

all 8 plots correct [2]
6–7 plots correct [1]</td><td>4</td></tr>
<tr><td>8(c)(ii)</td><td><table><tr><th>rank</th><th>country</th></tr><tr><td>1st</td><td>Spain</td></tr><tr><td>2nd</td><td>France</td></tr><tr><td>3rd</td><td>Italy</td></tr></table>;</td><td>1</td></tr>
</table>

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Question	Answer	Marks
8(d)	*Level of response marked question:* Level 3 [5–6 marks] A detailed discussion of the sustainability of fishing. Responses may refer to global and international issues as well as local concerns. The response will reach a conclusion. The response is likely to include specific examples or development to support the statements made. Responses may also include a description of the technological advances made with regards to fishing. Level 2 [3–4 marks] Provides a response which evaluates the issues relating to the sustainability of fishing but lacks detail or developed statements. Or Provides a detailed response argued from one perspective, often with specific examples or developed ideas. Level 1 [1–2 marks] Response may be simpler in approach, lacking detail, perhaps in the form of a list or bullet points. May only consider local fishing. Lack of a detailed description. Response may focus on one side. No response or no creditable response [0]. *Level of response indicative content:* Candidates may partially agree or disagree with the statement. Some candidates may begin by considering what sustainable fishing means. Candidates may start by defining sustainable fishing, e.g. meet the needs of the current generation while preserving the fish stocks for future generations.	**6**

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Question	Answer	Marks
8(d)	***Not*** *possible to make all fishing sustainable:* Candidates may cover the increasing human population and high demand for fish and consider that in some areas fish is only (major) source of protein. Candidates may also cover actions that are used to control overfishing, e.g. quotas, specific fishing zones / no-fish zones, restrictions of net size, restrictions on seasons for fishing, licensing of boats, inspections of catch and the difficulties in enforcement and monitoring of these. Candidates may conclude it is not possible to monitor all fisheries. *It* ***is*** *possible to make all fishing sustainable:* Candidates may state fishing needs to be made sustainable otherwise if fishing is unsustainable there will be a shortage of fish for future years. Candidates may cover ways to make fishing more sustainable, e.g. a wider range of fish could be fished. Candidates may discuss the fact that fishing results in a lot of waste / bycatch and that some countries waste a lot of food. Candidates may consider alternatives to fish, for example plant-based protein (vegetarian diet) as a more efficient use of resources. Some candidates will consider the use of fish farms.	

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