Cambridge Assessment International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/12**

Paper 1 Theory **March 2021**

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 2021 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.

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.

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.

Question	Answer	Marks
1(a)(i)	stratosphere;	**1**
1(a)(ii)	*any two from:* higher levels of ultraviolet radiation (reaching the Earth's surface); increased rate of skin cancer; increased rate of cataracts; damage to vegetation;	**2**
1(b)	*any two from:* idea that atmosphere has no international boundaries; idea that atmosphere is still damaged if, not a complete ban / some countries don't agree; need for shared, expertise / knowledge / technology / funding ; international agreement needed on how to dispose of chemicals that affect ozone depletion, e.g. CFCs;	**2**

Question	Answer	Marks
2(a)	*any three from:* overcrowding; lack of sanitation / open sewers; lack of clean drinking water; no access to vaccinations / lack of health care; no, regulation / control, of pollution; lack of organised health education;	**3**
2(b)	cholera / AVP;	**1**

Question	Answer	Marks
3(a)(i)	*correctly identified:* the carrying capacity; the exponential phase; the lag phase;	**3**
3(a)(ii)	*any two from:* effect of climate change; change in food chain; change in habitat ; introduction of new species / change in competition; natural disasters; availability / lifetime, of resources e.g. minerals, water, food;	**2**
3(b)	pyramidal shape with wider base with progressive change; divided into age categories for male and female;	**2**

Question	Answer	Marks
4(a)	**A**: combustion; **B**: respiration; **C**: decomposers;	**3**
4(b)	(the) Sun;	**1**

Question	Answer	Marks
5(a)	*any two benefits from:* renewable; does not produce, greenhouse gases / polluting gases / CO_2, (at the point of use); can be used on homes / buildings, to generate own electricity; cheap to run (after installation); *any one limitation from:* not reliable / won't work at night or if cloudy / requires light conditions / weather-dependent; back-up power stations are needed; expensive to install; batteries cannot store much energy;	**3**
5(b)	*any three from:* overall increase in energy used; decrease in consumption of petroleum; natural gas predicted to increase (slightly); (slight) increase in consumption of coal; increase in consumption of renewable energy resources; quoted data;	**3**
5(c)	*any two from:* increases, personal wealth / standard of living; higher level of, vehicle ownership / transportation; higher domestic usage / more appliances used in homes; able to afford cost of investing in new technologies or renewable energy or named technology e.g. fracking / exploration;	**2**
5(d)	*any two from:* reduction in heat loss e.g. insulation, double, triple glazing; turn off electrical devices / don't use stand-by or sleep mode / limit time using electrical devices; use energy-efficient devices; heat recovery schemes; improve natural light; better natural ventilation (rather than air conditioning); ICT control of the living environment e.g. smart devices;	**2**

Question	Answer	Marks
6(a)(i)	correct plot of 1.9 tonnes;	1
6(a)(ii)	*any two from:* Nepal emits less CO_2 than USA / ORA; idea that (increased) CO_2 contributes to climate change / CO_2 is a greenhouse gas / Nepal contributes to a lesser extent than USA; quoted data; idea that bar chart, only shows CO_2 data / does not show other greenhouse gases, so not all contribution known;	2
6(b)	Jun – Sep circled;	1
6(c)(i)	49(.3)(%);	1
6(c)(ii)	*any three from:* loss of, homes / shelter; loss of, roads / bridges / infrastructure; loss of jobs / economic impact; loss of, crops / farmland / habitats / food production; increased migration; lack of, clean water / adequate sanitation; risk of, water-related diseases / cholera / typhoid / malaria; lack of medical supplies; (cost of) rebuilding (homes, roads);	3
6(c)(iii)	*any two from:* deposition of silt on farmland / increased fertility of soil, after flooding nowhere else to move; lack of money; family / traditional, ties; employment / economic reason; confidence in protection measures;	2

Question	Answer	Marks
6(d)	*any two from:* different terrains, make it difficult to compare the whole of Nepal / affect local climate conditions; not all of the land was sampled / not representative sample; historic data limited; AVP;	**2**
6(e)(i)	*any two from:* idea of lack of control, e.g. not eaten by livestock / no local consumer; many seeds produced per plant; seeds are light in weight / many seeds in 1 g / seeds easily transported (by wind or animals or insects); climate change has led to increased temperatures;	**2**
6(e)(ii)	*any one from each method:* *mechanical control:* labour intensive / plants not always (completely) removed / plants can regrow / would need to be repeated regularly / plant could still be eaten by horses / may damage other plants; *grazing control:* livestock do not like the taste / damaging to horses / would be difficult to clear large areas of land / roots not removed; *biological control:* unknown effect of introducing a new species / new species might become invasive / changes food chain(s); *chemical control:* negative effect of using a chemical / bioaccumulation or build-up in food chain / effect on non-target species / run-off to other areas;	**4**
6(f)(i)	subsistence farming is the production of food primarily for consumption by the people on the farm; commercial farming is farming to, make a profit / export / sell;	**2**

Question	Answer	Marks
6(f)(ii)	*opinion based on evidence linked to the speech bubbles* *any five from:* *'ground water supplies often run dry before the start of the rainy season'* development has addressed water shortages; *'Many farming families have had to move to the city to find other work'* (the project) has allowed farming to continue; *'The project is partly funded by an international charity'* raises the profile of the project; charity helps meet the costs of the project; *'...we pay to be part of the project. We must give one day of free labour a year to the project'* farmers need to show commitment; *'we have been trained in a growing a variety of high-yielding crops'* farmers taught to, be more productive / use best practice; wider range of crops means reduced risk if one crop fails; greater income; *...use intercropping…'* increases yield (from farm); reduces soil erosion; *'...funds polytunnels,'* increases range of plants grown; optimises growing conditions; helps to manage irrigation; *'pest resistant seeds'* reduced use of chemicals / less damage to food chain; *'water harvesting and storage'* supplies water for irrigation;	**5**

Question	Answer	Marks
7(a)	**A:** constructive; **B:** destructive;	**2**
7(b)	*any four from:* two plates moving in relation to each other; plates get stuck / reference to friction; causes a build-up of pressure (because plates are still trying to move); sudden release of pressure; causes sudden release of energy; causes, a seismic wave / ground to shake / tremors;	**4**
7(c)(i)	*any two from:* as ocean depth increases, wave height decreases; as ocean depth increases, wave speed increases; as wave speed increases, wave height decreases;	**2**
7(c)(ii)	*any three from:* monitoring and warning; land use zoning; structure of buildings / example of design feature; disaster preparation, e.g. plans, drills, shelters, emergency supplies of food / water / medicines; emergency rescue teams; evacuation; rebuilding of damaged areas; conserve natural protection;	**3**

Question	Answer	Marks
8(a)(i)	(global) increase over (60) years; (global) 5 times higher than in 1960; (global) from 60–70 million to 320–340 million tonnes;	**3**
8(a)(ii)	*any two from:* increased world population; demand for meat has increased / more farms; rising incomes / more people who can afford meat;	**2**
8(b)(i)	*any one from:* livestock release methane / methane is a greenhouse gas; production of protein or food from vegetation is more efficient (therefore less resources or land used); livestock require more energy input;	**1**
8(b)(ii)	reduces human population increase; *any one from:* fewer resources / less energy, used; less (land needed for the) production of food; less (land needed for) homes; reduction in greenhouse gas emissions;	**2**

Question	Answer	Marks
8(c)	*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] *Indicative content for:* Improved education of women is the best way of managing human population size. *benefits of stated method:* gives women opportunities outside of the home more employment opportunities / careers / later marriages educated women pass their knowledge onto children education gives women information about birth control enables women to have more choices	**6**

Question	Answer	Marks
8(c)	*limitations of stated method:* cultural barriers to overcome women in remote communities can be educated but still not have access to family planning or other life choices families need financial encouragement or fines from government some countries encourage families to have more children some countries have an ageing population so need more children LEDC vs MEDC / economic climate (male) fertility levels decreasing / availability of fertility treatments or medicine other strategies are needed e.g. access to birth control *other methods:* family planning improved health national population policies – pronatalist and antinatalist	