Cambridge Assessment International Education

Cambridge O Level

ENVIRONMENTAL MANAGEMENT **5014/12**

Paper 1 Theory **October/November 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 October/November 2022 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	<u>'List rule' guidance</u> 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)	nitrogen; 20%;	**2**
1(a)(ii)	*any two from: (list rule applied)* carbon dioxide; water vapour; argon / noble gas ; methane;	**2**
1(b)	plants / photosynthesis;	**1**

Question	Answer	Marks
2(a)(i)	340(m);	**1**
2(a)(ii)	*any two from:* more food supply for fish; shallow so warms up more quickly; more light for photosynthesis; lack of gradient / flat; (closer to shore) so leached nutrients/minerals in high concentration;	**2**
2(a)(iii)	*any two from:* nearer to land; so easier for more fishing boats to access; more risk of pollution; shallower water; so can use smaller boats; more fishing; increase risk of bycatch / catching immature fish;	**2**

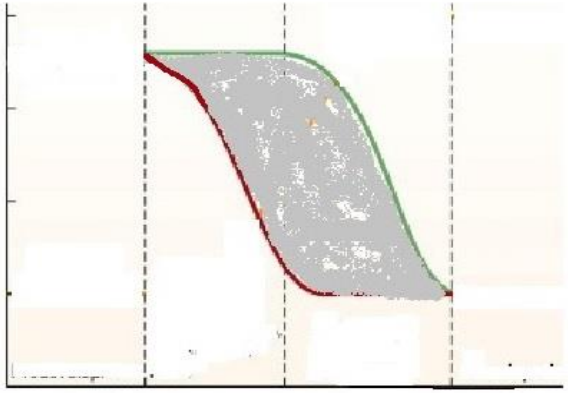
Question	Answer	Marks
2(b)	*any three from:* reduces fishing of wild fish; reduces the risk of overfishing / bycatch; fewer mature fish are caught; so more fish can breed; allows wild stocks to replenish;	**3**

Question	Answer	Marks
3(a)(i)	460 000;	**1**
3(a)(ii)	2001–2003 to 2010–2013;	**1**
3(b)	*any three from:* natural disasters do not occur in similar numbers each year; some natural disasters cause more deaths than others; individual disasters can vary in intensity (e.g. some cyclones are stronger than others); individual disasters vary in location so impact can vary (impact in some countries greater than others);	**3**
3(c)	*any two from:* earthquake; volcanic eruption; tsunami;	**2**

Question	Answer	Marks
4(a)(i)	bar plotted at 3200;	**1**
4(a)(ii)	(nuts) sheep / goat meat eggs milk fruit vegetables sugar 3 correct; 6 correct;	**2**
4(b)	*any three from:* agriculture is a major use of water; finite water supplies; if more used for agriculture, less available for people; use of pesticides might pollute water; fertiliser (run-off) will pollute water; animal waste may contaminate water sources;	**3**
4(c)	*any four from:* grow varieties of crops / produce which require less water / genetically modified crops / selective breeding; rainwater harvesting / example of; use of trickle drip irrigation / clay pot; mulching; recycling of water / example of; use of reservoirs to collect run-off;	**4**

Question	Answer	Marks
5(a)(i)	both points plotted correctly; 3 lines drawn to complete line graph;	**2**
5(a)(ii)	*any two from:* (almost constant) increase in energy consumption; slight dip in 2009; from 1700 (in 1985) to 3150 kW h (in 2015);	**2**
5(a)(iii)	*any four from:* different mean temperature / climate; different light levels / light intensity; availability of electricity supply / infrastructure; affordability of electricity / electrical appliances; level of industrial development; number of electrical devices in countries; availability of alternatives to electricity;	**4**
5(b)	*any four from:* use more energy-efficient devices; reduce use of (energy-consuming) devices; do not leave equipment on 'standby' / switch off when not used; use double/triple glazing / use better insulation; use windows to allow ventilation (rather than using air-conditioning); add windows to increase light levels;	**4**

Question	Answer	Marks
6(a)	*any four from:* lionfish are inedible; therefore nothing will feed on them (no predators); eat large quantities; impact on food web; decrease in populations of small fish; introduced/invasive species (to the Atlantic Ocean); means competition to other (native) organisms; lay large quantities of eggs; large population increase;	**4**
6(b)	*any three from:* around coastal regions/area; of (South) East USA / named country; west of Atlantic Ocean / Eastern / Atlantic coast; Caribbean Islands; Caribbean Sea / Gulf of Mexico; description of extremities of range;	**3**
6(c)	targeted catch / only lionfish are killed / no bycatch; less/no damage to corals / seabed;	**2**

Question	Answer	Marks
7(a)(i)	36 (per 1000 population);	**1**
7(a)(ii)	shading of sections 2 and 3 OR as shown; 	**1**
7(a)(iii)	**X** drawn on the graph in the fourth section;	**1**
7(b)	*any two from:* improved health services, e.g. vaccinations, availability of doctors, medicine; improved nutrition; improved sanitation / potable water supply / housing; lack of wars / peace; improved standard of living;	**2**
7(c)	*any three from:* tax incentives; free schooling; other incentives, e.g. free housing; government promotion / public information / advertising; banning abortion / contraception;	**3**

Question	Answer	Marks
7(d)	*any four from:* greater proportion of dependants; increased need for medical care; more of the working population needs to be carers; reduced numbers of people in work; increased burden on country for pensions; reduction to GDP / economy; reduced money for other services (for young people);	**4**

Question	Answer	Marks
8(a)(i)	*any two from:* too close to village; deforestation required / loss of habitat; mining will cause visual/noise/air pollution; people would need to be relocated;	**2**
8(a)(ii)	*any two from:* can't use open-pit / have to use subsurface / shaft so will be more difficult / subsurface mining is expensive; small amount of reserve available; topographically less accessible; geology; location / depth of the reserves; cost effectiveness of extraction; safety - qualified;	**2**
8(b)	*any two from:* employment activities in the mine; supply of services / products to miners; improvement to road system; improvement to support services / medical / schools; improvement to the economy;	**2**
8(c)(i)	2100;	**1**

Question	Answer	Marks
8(c)(ii)	tin;	**1**
8(c)(iii)	*any three from:* increased efficiency of the extraction of rocks and minerals; increased efficiency of the use of rocks and minerals; recycling of rocks and minerals; legislation / quotas; using alternative materials;	**3**
8(c)(iv)	*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 statements. Level 2 [3–4 marks] **Development and support of the conclusion is evident, though the response may lack some coherence and/or detail.** Indicative content and subject-specific vocabulary are used but may lack some precision and/or accuracy. Irrelevant detail may be present. 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]	**6**

Question	Answer	Marks
8(c)(iv)	*Indicative content for:* *Topic:* Use of minerals *Main idea:* Prioritise the use for essential uses. *agree*: minerals are a finite resource many will run out soon specific example given (e.g. from table) some uses do not add a benefit, e.g. jewellery doesn't help world / aesthetic should ensure efficient use and not wasted sustainable use preventing use on non-essentials will mean stock available for future generations *disagree:* who decides what is essential? what is essential? Benefits to the economy or the environment? difficult to get all governments to agree limiting use will cause a price rise some uses such as jewellery / cosmetics still benefit people's well-being if these materials are banned, others will take their place use of jewellery / cosmetics might be traditional should focus on efficient use / recycling of resources what is considered essential now, might not be essential in the future economic impact on jewellery / cosmetic industry and people employed	