CAMBRIDGE
International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/13**

Paper 1 Theory **October/November 2024**

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 2024 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 descriptions 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.

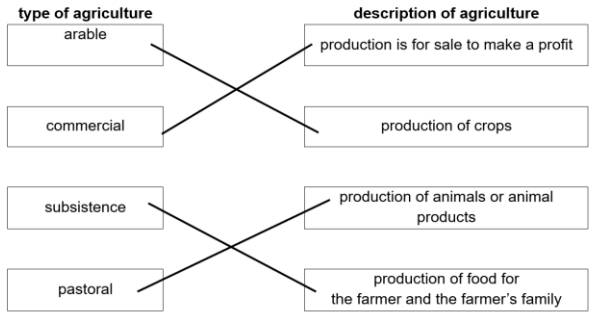
7 Guidance for chemical equations

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)	*any two from:* condensation; infiltration; evaporation; ground water flow; precipitation; surface run off; transpiration; through flow;	**2**
1(a)(ii)	*any two from:* ocean; clouds / atmosphere; lake / reservoir; stream / river; ground water; glacier;	**2**
1(b)	water is stopped from reaching the soil by leaves / foliage, on vegetation;	**1**
1(c)	the Sun;	**1**
1(d)	permafrost;	**1**

Question	Answer	Marks
2(a)	*four marks (2 plus 2)* coasts (2): cold ocean currents; upwelling; carrying nutrients; continental shelves (2): areas of shallow water; more, light / oxygen; more, nutrients / plankton;	**4**
2(b)	*any two from:* laws / quotas; net types; mesh size; closed / breeding seasons / protected areas / reserves; monitoring / implementation of, international agreements; pole and line fishing;	**2**

Question	Answer	Marks
3(a)	 1 correct = 1 mark 3 correct = 2 marks	**2**

Question	Answer	Marks
3(b)	*MAX one for each section:* *overuse of insecticides:* loss of biodiversity; loss of pollinators; disrupts food chain; kills non target species; *overuse of fertilisers:* eutrophication nutrient enrichment; algal blooms; *mismanagement of irrigation:* salinisation; waterlogging; soil erosion; crop failure;	**3**
3(c)	*any two from:* managed planting; allows mixed cropping; reduces soil erosion; captures / stores, carbon; leaf litter adds carbon; retains biodiversity; fruits / nuts / timber, harvested;	**2**

Question	Answer	Marks
4(a)	*any four from:* energy is released from uranium; water heated / turns to steam; (steam), turns / drives / spins / runs a turbine; turbine turns / drives / spins / runs a generator; steam is cooled (in condenser / cooling tower) back to water (and used again);	**4**
4(b)	*any three from*: does not produce carbon dioxide emissions; does not contribute to, enhanced greenhouse effect / global warming / climate change; does not produce, sulfur dioxide / oxides of nitrogen (NOx); does not contribute to acid rain;	**3**
4(c)	*any three from*: considered dangerous, uranium / fuel / waste, is radioactive; risk of, accidents / radiation leaks; exposure to (high) radiation levels can cause, cancers / leukaemia / mutations / radiation sickness or poisoning; not renewable;	**3**
4(d)(i)	*any three from*: renewable / sustainable, source of energy; does not cause, air pollution / global warming / acid rain; does not occupy land / so does not affect, agriculture; generates (50%) more electricity (than a land-based power station);	**3**
4d(ii)	*any one from*: organisms / plants / animals in the reservoir die / habitat destruction; biodiversity is limited;	**1**

Question	Answer	Marks
5(a)(i)	correct plotting; bar same width;	**2**
5(a)(ii)	increase from 1980 to, 2000 / 2009; decrease from 2009 to, 2010 / 2019;	**2**
5(b)(i)	sectors in clockwise rank order; largest first starting at 'noon'; correct plotting; key completed AND matches sector shading;	**4**
5(b)(ii)	storms AND droughts AND floods;	**1**
5(b)(iii)	801 468;	**1**
5(b)(iv)	1882;	**1**
5(b)(v)	5° and 20°;	**1**
5(b)(vi)	*any three from:* improvement in, monitoring / early warning systems; disaster preparation, plans / drills / emergency supplies / emergency rescue teams; evacuation; international aid; emergency shelters; improved medical care;	**3**

Question	Answer	Marks
5(b)(vii)	*any five from:* heavy / prolonged, rainfall; rapid surface runoff; impermeable, rock / surfaces / compacted soil; soil becomes saturated; rivers overflow; rapid snowmelt following a rise in temperature; height / shape / relief of land; fast runoff on steep slopes; water accumulates on, flat land / deltas; deforestation increasing surface runoff; eroded soil reduces carrying capacity of river channels; urbanisation; impermeable, concrete / tarmac; inadequate drains; storm surges as a result of, tropical cyclones / large storms; tsunamis caused by undersea, earthquakes / landslides; rise in sea level as a result of global temperature increasing; thermal expansion of oceans; melting ice caps;	**5**
5(b)(viii)	any three from: lack of, monitoring / early warning systems / disaster preparation; higher population growth / density, in LEDCs than MEDCs; increased numbers, on flood plains / near coasts / in urban areas; poor housing / infrastructure; no emergency, shelters / supplies / rescue teams; poor health / medical care; increased risk of death from, water related / vector borne, diseases;	**3**
5(c)(i)	table drawn with minimum of three column headings for event, year and (financial) loss; unit: USD in the column heading only; all data for event, year and financial loss recorded;	**3**

Question	Answer	Marks
5(c)(ii)	*any two from:* all occurred in, the USA / an MEDC; Katrina had highest loss / Andrew had the least; three of the six storms were in 2017 / the, last 10 years / last decade of the data; the financial losses increased in 2017 as the total losses were, 224.5 billion USD / more than the losses caused by Katrina in 2005; total losses from all 6 events was 490.9 billion USD;	**2**
5(d)	earthquake; volcanic eruption;	**2**

Question	Answer	Marks
6(a)	*any three from:* overall increasing; steady growth 1800 to 1930; rate increases between 1930 to 2056; rate decreases after 2056 / idea of levelling off; relevant quoted data;	**3**
6(b)	*any two from:* decrease AND reasons: fossil fuels are finite; more fossil fuels used for electricity generation / greater demand; • for heating; • for transport; • for industries / manufacturing; more fossil fuels used as raw materials for plastics; OR little / no impact AND reasons: people use renewables; keep existing reserves for future generations;	**2**

Question	Answer	Marks
6(c)(i)	Max 2 dependent populations: Nigeria higher percentage dependents (46 % Italy 36%); Nigeria higher percentage of young dependents / ORA; Nigeria lower percentage old dependents / ORA; working populations: Nigeria lower percentage working population / ORA; greatest proportion of working population in the 15–19 age range in Nigeria and 50–54 in Italy;	**3**
6(c)(ii)	*any two from:* more money needed for, healthcare / social care / pensions; increase in taxes on working population; reduction in the working population; decrease in country's wealth / GDP;	**2**
6(d)	*Level of response marked question:* <u>Level 3</u> [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. <u>Level 2</u> [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. <u>Level 1</u> [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.	**6**

Question	Answer	Marks
6(d)	No response or no creditable response [0 marks] *indicative content for:* The education of girls in LEDCs is the best strategy for managing world population growth. *agree:* LEDCs tend to have higher birth rates girls in LEDCs have less access to education than boys many girls in LEDCs are illiterate need to know how to – • control fertility • plan number of children / use contraception need to understand – • benefits of small families • the global impacts large populations have qualifications – • for careers / gain economic independence • so they marry when they are older, not when they are children • so they delay child bearing / decide to have fewer children have the ability to take better care of own health / families' health • improving the survival of children education changes attitudes education reduces poverty *disagree:* education of boys in LEDCs is just as important LEDCs lack the infrastructure to provide universal public education education of girls / both genders needs supporting with other strategies • improved health services • family planning advice centres • gender equality laws / gender-responsive teaching • schools need to be safe places for girls (safety / hygiene / sanitation needs of girls must be met in the schools) • national population policies	

Question	Answer	Marks
6(d)	education is as important for boys and girls in MEDCS and LEDCs if world population growth and its effects on environment are to be managed effectively response may be supported by one or more case studies of named countries / regions (China, France, India, Singapore, South Korea, Kenya)	