CAMBRIDGE
International Education

Cambridge IGCSE™

ENVIRONMENTAL MANAGEMENT **0680/13**

Paper 1 Theory **May/June 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 May/June 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U 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.

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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.

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.

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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)	(igneous) basalt / granite ; (sedimentary) limestone / sandstone / shale ;	**2**
1(b)	any three from : erosion of rock / weathering ; deposited in water / seas / riverbed ; in layers ; compacted / under pressure, (to form rock) ;	**3**

Question	Answer	Marks
2(a)(i)	trickle drip ;	**1**
2(a)(ii)	any two from : water only given directly to plants/roots ; less water evaporation (from soil) ; water source lasts longer / less wastage ; less /no (risk of) salinisation / water logging ; less (risk of) erosion (by run off) ;	**2**
2(b)	transpiration ;	**1**

Question	Answer	Marks
3(a)	detergent (sprays) ;	**1**
3(b)	booms ; skimmers ;	**2**

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Question	Answer	Marks
3(c)	any three from: kills fish / kills (sea) birds / marine mammals ; prevents light reaching producers / phytoplankton ; damages / kills coral reefs ; damage to beaches / mangroves ; disrupts food chain ;	**3**

Question	Answer	Marks
4(a)	carbon dioxide oxygen water glucose ;;	**2**
4(b)	chlorophyll ;	**1**
4(c)	respiration ;	**1**
4(d)	trees take in / absorb carbon dioxide ;	**1**

Question	Answer	Marks
5(a)	bar plotted correctly for Chile ; bar plotted correctly for Ethiopia ;	**2**
5(b)	any four from : plates move apart / constructive boundary ; plates pushed under another / destructive boundary / subduction ; rock / plate melts / becomes magma ; movements caused by convection currents ; magma / molten rock behaves as a liquid ; magma lighter than solid rock ; (so magma rises) through vents ;	**4**

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Question	Answer	Marks
5(c)(i)	any two from : MSH higher (plume) height ; more (eruptive) volume ; so more emissions / ash / gas; travels longer distance ;	**2**
5(c)(ii)	0 *;*	**1**
5(c)(iii)	B has a greater / higher / larger (magnitude than A) ; B more risk / level of danger 100 x greater magnitude / each level is 10x increase in magnitude ;	**3**
5(c)(iv)	any two from : people live close to the volcano / estimated distance / not enough time to evacuate ; (The ash cloud / plume) could make them ill / respiratory problems / death ; damage property / infrastructure/ roads / crops ;	**2**
5(c)(v)	any four from : sulfur dioxide ; nitrogen oxides / NOx ; dissolve in water / react with ; (to form) sulfuric acid ; nitric acid ;	**4**
5(d)	any two from : limited land suitable for farming ; soil is rich in minerals / do not need fertilisers / fertile soil ; risk to life / crops is low ;	**2**

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Question	Answer	Marks
5(e)	any five from: land zoning / town planning regulations (to avoid construction in high risk areas) ; buildings made to resist earthquakes ; so less collapse / risk of killing people ; disaster preparation / rapid response teams/medical aid/food and shelter ; effective early warning systems / monitoring ; so people know to evacuate ; drills / preparation / plans ; so evacuation is safe / controlled/prevents panic ; people get to a safe area ;	**5**

Question	Answer	Marks
6(a)	5 and 20 (degrees) ; 60 (metres) ; 27(degrees) ;	**3**
6(b)(i)	August ;	**1**
6(b)(ii)	June and October ;	**1**
6(b)(iii)	17%;	**1**
6(b)(iv)	any two from : they change direction out at sea ; they do not have enough energy to remain typhoons / reduce to storm force ; predictions were incorrect ;	**2**

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Question	Answer	Marks
6(c)(i)	any two from : fewer typhoons ; the sea not as hot (around / near Japan) / warmer water further away (from Japan) ; so it is not hot enough to form a typhoon / only forms storms ; typhoons move on a different track / typhoons move in an easterly direction ;	**2**
6(c)(ii)	fewer fish/heavy rainfall ;	**1**

Question	Answer	Marks
7(a)	any number from 16 to 20 ; correct multiplication / larger area 22 of number above ;	**2**
7(b)	It connects two different countries/cross border ;	**1**
7(c)(i)	any three from : Increased access to prey / water ; free movement of prey ; finding a mate / reproducing ; reduced chance of extinction ; maintain genetic diversity in the population / reduces inbreeding ; reduced disturbance by humans / larger habitat / territory ; gives a suitable habitat in the case of wildfires ;	**3**
7(c)(ii)	any two from: tourists have to live the same as local people / no hotels / accommodation built ; limited damage to environment / small scale ; local people can make money (so likely to help protect habitat/tigers) / helps fund conservation project ; can go on for a long time / future generations can still do it ;	**2**

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Question	Answer	Marks
8(a)(i)	4 ;	**1**
8(a)(ii)	Uranium ;	**1**
8(a)(iii)	obtained from rocks / will run out / finite ;	**1**
8(a)(iv)	any two from : coal ; oil ; (natural) gas ;	**2**
8(a)(v)	any two from: lack of funds/too expensive to build ; lack of expertise to build ; other cheaper non-renewables available ; plenty of other energy available ; lack of access to nuclear materials / uranium ; public opinion / produces toxic waste ; lack of suitable location ;	**2**
8(b)	any three from : Uranium / fuel decays (giving off heat) ; water warmed / boils / heated ; turns to steam ; steam turns / rotates / spins turbine ; turbine turns / powers generator ;	**3**

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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* agree does not produce carbon dioxide fuel does not contain carbon not a fossil fuel not weather dependent established technology energy dense fuel 24 / 7 supply of energy	**6**

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Question	Answer	Marks
8(c)	disagree Uranium is a non-renewable resource/finite limited number of safe sites for nuclear power need a large supply of water waste disposal a problem with nuclear power risk of radiation leaks change to electric cars rather than oil will give a bigger reduction other resources are easier / quicker to build other sources of energy that release carbon dioxide renewable energy sources don't produce carbon dioxide and are safer than Uranium alternative renewable energy sources would be better	

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