CAMBRIDGE
International Education

Cambridge O Level

ENVIRONMENTAL MANAGEMENT **5014/12**

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	<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)	**A**: metamorphic; **B**: igneous; **C**: sedimentary;	**3**
1(b)	metamorphic;	**1**
1(c)(i)	surface mining;	**1**
1(c)(ii)	*any three from:* accessibility; environmental impact assessment; (supply and) demand; public opinion; cost; geology;	**3**

Question	Answer	Marks
2(a)	conservative circled;	**1**
2(b)	*any two from:* plates are sliding past each other / plates do not move towards each other / plates do not move away from each other; lithosphere is not, destroyed or weakened; no rock gets pushed down into mantle; so no molten rock / no magma, can come to surface;	**2**
2(c)	earthquakes;	**1**

Question	Answer	Marks
3(a)	between 5 and 20° north or south of equator; over an ocean;	**2**
3(b)	*any three from:* flooding; contamination of water supply; by human waste; increased risk of transmission / people living closely together (in evacuation camps); standing water; breeding ground for mosquitoes;	**3**
3(c)	*any two from:* drills; emergency supplies / stockpile food and water; medical supplies; evacuation, routes / centres; rescue teams; communication method; advanced warnings;	**2**
3(d)	allows people to evacuate / allows preparation plan to be implemented;	**1**

Question	Answer	Marks
4(a)	*total 4:* *max 3 day:* algae photosynthesise; (more) oxygen produced; concentration increases; (rate of) photosynthesis greater than respiration; *max 3 night*: algae respire; (more) oxygen used; concentration decreases;	**4**
4(b)(i)	hiding from / easier to be seen by, predators / avoiding predators;	**1**
4(b)(ii)	less time to feed;	**1**
4(c)	*effect:* more artificial light; *any one reason:* more people / cars / buildings / street lights;	**2**
4(d)	low-pressure sodium;	**1**

Question	Answer	Marks
5(a)	*Any three from:* largest mass in centre / decreasing mass from centre out; largest mass closer to, California / USA / in east; relevant quoted data; e.g. centre contains 100 kg / km^2 largest area contains the lowest concentration of plastic;	**3**

Question	Answer	Marks
5(b)(i)	axes labelled with unit: length of plastic waste / cm and percentage of plastic waste; sensible linear scale such that the data occupies at least half the grid; data plotted correctly; bars of equal width;	**4**
5(b)(ii)	21(.0);	**1**
5(b)(iii)	0.144 / 0.14;	**1**
5(c)	*any one from marine animals:* suffocation; mistake plastic for food; poisoning; reduced food sources / starvation; trapped in plastic; *any one from fishing industry:* reduced catch / cannot fish in the zone; cost of clean-up;	**2**
5(d)	arrows in a clockwise direction; warm currents moving north and cold current moving south;	**2**

Question	Answer	Marks
6(a)	*any two from:* plant trees; build wind breaks; bunds; add organic matter;	**2**
6(b)(i)	crop rotation;	**1**

Question	Answer	Marks
6(b)(ii)	*any three from:* crops all year round / efficient use of labour; reduced risk of complete crop loss; maintains soil fertility / reduces risk of soil exhaustion; plant roots bind soil; maintains soil structure; continuous covering over soil prevents (wind / rain) erosion; reduces need to buy fertilisers; reduces pests / diseases;	**3**
6(c)	*max two benefits:* large scale / covers the whole field; automatic / does not need a person to operate; *max two limitations:* cost of machine; requires fuel to operate; evaporation of water (before reaching soil); water doesn't reach soil / roots;	**3**

Question	Answer	Marks
7(a)	east; decreased; nutrients; decreased;	**4**
7(b)	*any two from:* overall: more land is impacted by La Niña; 44% La Niña compared to 31 % El Niño; positive impact: La Niña 43% compared to 20 % El Niño; negative impact: La Niña 13% compared to 11% El Niño;	**2**

Question	Answer	Marks
7(c)	*any five from:* water sources dry up; increased soil erosion; desertification; increased risk of wildfires; decrease in air quality; decline in crop yields; death of livestock; starvation / dehydration; migration (from rural areas) / lack of jobs / loss of income; loss of habitat / reduced biodiversity;	**5**

Question	Answer	Marks
8(a)(i)	to limit water running into container;	**1**
8(a)(ii)	to allow water to drain away / so organisms do not drown;	**1**
8(a)(iii)	*any one from:* so organisms do not eat each other; so organisms do not starve; traps are small so quickly fill up;	**1**
8(b)(i)	40;	**1**
8(b)(ii)	*idea of:* the type of cover has no effect on the (mean) number of organisms collected;	**1**
8(c)	pooter;	**1**

Question	Answer	Marks
9(a)(i)	China;	**1**
9(a)(ii)	China;	**1**
9(b)(i)	27 ÷ 468; 5.769 / 5.8 / 5.77 / 6;	**2**
9(b)(ii)	*any two from:* EU already had a lot of coal-fired power stations; economy of Philippines has improved / more money in the Philippines than before; EU uses other types of power stations / renewable energy; increased demand in Philippines; EU countries are MEDCs; population growth in Philippines is greater;	**2**

Question	Answer	Marks
9(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:* Generating electricity using fossil fuels should be banned in every country *reasons for a ban:* a ban would encourage investment in alternative technology burning fossil fuels causes air pollution pollution described: increases CO_2, global warming, climate change increase SO_2 / NOx, acid rain increases particulates, smog, causes respiratory problems air pollution is a global issue	**6**

Question	Answer	Marks
9(c)	*reasons against a ban:* not all countries would agree would be impossible to enforce global population increasing can't meet existing electricity needs many people would be left without electricity alternatives not available in some countries renewables dependent on conditions strength of wind / intensity of light / terrain nuclear alternative has other risks described nuclear risks economic collapse	