
ENVIRONMENTAL MANAGEMENT

8291/21

Paper 2

May/June 2019

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.

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This document consists of **14** printed pages.

PUBLISHED**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.

PUBLISHED**SECTION A**

Question	Answer	Marks
1(a)(i)	<p>Deforestation in Nepal: reduced evapotranspiration; increased run-off; faster soil erosion; increased silting; increased volume of water in rivers;</p> <p>Dams in India: reduced / intermittent flow; increases silting in Bangladesh; which reduces river depth;</p> <p>Increased Population: increasing urbanisation / construction; removal of trees; reduction in absorbent surfaces; increases run-off; more wells dug; lowers water table; leading to land subsidence;</p>	max 6
1(a)(ii)	<p>70% of land is < 1 m above sea level / low-lying; Bangladesh is a flood plain; coastal defences inundated from both sides; coastal cities / named cities could flood / flooding occurs; damaging property / housing / infrastructure; increased salinization of soil leads to agricultural land being abandoned; salinization of water supply; less likely to have maintained levees; increased snow melt / increased rainfall contributes to flooding; population movement; loss of biodiversity;</p>	max 4

Question	Answer	Marks
1(b)(i)	as population grows; the percentage of people in water scarcity increases; as population grows; the amount of water withdrawals triples; as population grows; global water availability declines;	max 2
1(b)(ii)	$8.5 \times (47 / 100)$; 3.995 (Billion) / 3 995 000 000;	2
1(b)(iii)	water demand is total needed from sources for domestic / industrial / agricultural use / for population to survive;	1
1(b)(iv)	water needed for basic / <u>domestic</u> needs; example / e.g. hydration / hygiene / cooking / sewage systems; <u>industrial</u> use; for manufacture of goods / construction / energy generation; <u>agricultural</u> use; for growing food / animals; water used for non-basic needs; example / dishwashers, washing machines / washing cars / watering gardens;	max 5

Question	Answer	Marks
2(a)(i)	Northwest Kyushu sea area	1
2(a)(ii)	26 200; 5200 + 10 000 + 6000 + 5000 or 5000 + 10 000 + 6000 + 5000 or 5000 + 10 000 + 6000 + 4900 or 5200 + 10 000 +6000 + 4900;	2
2(a)(iii)	<u>Eutrophication</u> ;	1
2(a)(iv)	increased nitrate acts as fertiliser; plant growth increases rapidly; algae are plants and grow rapidly; excess growth leads to competition for resources; example e.g. sunlight; for photosynthesis; plants / algae die; decomposition occurs; microbes consume oxygen; for respiration; oxygen levels in water depleted; (invertebrates / vertebrates) die / move away;	max 6
2(a)(v)	waste from cattle farms; leaks from sewage; dumping / littering; industrial leaks; overuse of chemical fertilisers; overuse of manure; long term release of sewage from leaks; run-off;	max 2

Question	Answer	Marks
2(b)(i)	zooplankton; shrimp;	2
2(b)(ii)	less food for shark; increased predation of sardines / small fish; reduced feeding on zooplankton; increased population of zooplankton; more food for shrimp / small fish;	max 2
2(b)(iii)	monitoring; international cooperation; legislation; fines; education; fisheries management; marine conservation zone; cleaning up pollution events;	max 4

PUBLISHED**SECTION B**

Question	Answer	Marks
3(a)	<p>Human activity could include pollution (named pollutant), physical habitat changes such as deforestation, dams and agriculture, urban sprawl, infrastructure building, poaching and hunting.</p> <p>These can lead to lower biodiversity, change in succession, eutrophication, flooding and loss of habitat.</p> <p>Human activity could also be the various management strategies to protect the terrestrial ecosystems</p> <div data-bbox="349 520 817 592" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Please use level descriptors 1</p> </div>	10
3(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> • To explain the demands made by increasing population • To explain the importance of protecting the resources of the biosphere • To assess the different problems faced by countries with different levels of economic development in meeting both demands <p>Increasing population leads to increased demands for living space (development and infrastructure) and pressure on the resources of the biosphere (loss of habitat, pollution, agriculture demands).</p> <p>Protection of the biosphere is important to maintain the balance in the biomes and to prevent irreversible change and loss of biodiversity. Such protection requires will, finance, legislation and education.</p> <p>Countries with different levels of economic development face different challenges and demands placed on resources including financial.</p> <p>Some mention of international agreements impacting developing countries is valid.</p> <div data-bbox="349 1209 817 1281" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Please use level descriptors 2</p> </div>	30

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Question	Answer	Marks
4(a)	<p>Global warming leading to climate change, resulting in an increase in average yearly temperatures, which has led to loss of ice over the decades and the glacier retreating. Melting rate has increased in recent years. Shrinking size of lake at foot of glacier. Some reference to increase in open water as ice retreats from the lake.</p> <p>Linked to human activities such as deforestation, increased burning of fossil fuels especially in vehicles, decomposition in landfills increasing, increased agriculture.</p> <p>Pollution from soot deposits from vehicles has reduced the reflective nature of the ice making melting more likely. Some mention of erosion due to tourist / climbing activity is relevant</p> <div data-bbox="353 555 817 627" style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>Please use level descriptors 1</p> </div>	10
4(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> • To show understanding of the causes of water store loss • To explain the range of different water stores and how they are affected • To explain the problems in reaching international agreements <p>Water stores are lost because of climate change leading to melting of glaciers, reduced precipitation preventing groundwater and aquifers from replenishing and deforestation increasing run-off and flooding. Increasing population also leads to reduction through over-use, increased demand and waste. Human activity pollutes the water stores.</p> <p>Pollution crosses international boundaries and so do water resources such as rivers. Consequently, internationally agreed protocols are vital to begin reducing the rate of water loss and begin the reversal process.</p> <p>Political, financial and water-wealth issues affect the chances of reaching agreement. These include the demands of rising populations, industrial development, territorial ambitions and the availability of potable water.</p> <p>Reference to existing international protocols aimed at reducing emissions and rein in climate change. Description of the difficulties in obtaining agreements and comment on potential effects if able to reduce loss of water stores</p> <div data-bbox="353 1276 817 1348" style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>Please use level descriptors 2</p> </div>	30

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Question	Answer	Marks
5(a)	<p>Biggest human activity is clearance of forest for subsistence farming activities (including charcoal burning and fuel wood collection), palm oil plantations, urban expansion and mining. Some of these are illegal activities. Industrial logging is also a large factor, and the clearance for logging roads also increases hunting and larger farming opportunities (palm oil, sugar and rubber) which affect the rate of loss.</p> <p>Increased hunting and poaching alter the balance of species and alters the structure of the rainforest plants in terms of height and species.</p> <p>Burning for clearance also occurs.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Please use level descriptors 1</p> </div>	10
5(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> • To show understanding of the principles underlying ecotourism • To apply the principles of ecotourism to rainforests • To assess the relative successes of ecotourism projects <p>Ecotourism is defined as environmentally responsible travel to natural areas, in order to enjoy and appreciate nature (and accompanying cultural features, both past and present) that promote conservation, have a low visitor impact and provide for beneficially active socio-economic involvement of local peoples.</p> <p>Most tourism in natural areas today is not ecotourism and is not, therefore, sustainable. Ecotourism is distinguished by its emphasis on conservation, education, traveller responsibility and active community participation. Specifically, ecotourism possesses the following characteristics:</p> <ul style="list-style-type: none"> • Conscientious, low-impact visitor behaviour • Sensitivity towards, and appreciation of, local cultures and biodiversity • Support for local conservation efforts • Sustainable benefits to local communities • Local participation in decision-making • Educational components for both the traveller and local communities <p>Applying these underlying principles to rainforests such as the Congo can help conserve the rainforest.</p>	30

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Question	Answer	Marks
5(b)	<p>Advantages include preservation of species and the environment of the area, increased prosperity of the locals through involvement in the ecotourism, improved education, improved understanding of environment.</p> <p>Disadvantages include disturbance of the wildlife, damage and erosion caused by tourist numbers, increased carbon footprint of travellers, cultural erosion of traditional ways of life, travel industry is sensitive to world economic influences and this could lead to failure of projects.</p> <div data-bbox="353 453 817 523" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Please use level descriptors 2</p> </div>	

Section B descriptor levels:

Descriptor	Award Mark
Consistently meets the level criteria	Mark at top of level
Meets the criteria, but with some inconsistency	Middle, mark to just below top mark
Meets most of level criteria, but not all convincingly	Just below middle, mark to just above bottom mark
On the borderline of this level and the one below	Mark at bottom of level

Section B descriptor levels:**level descriptors 1****Level one, 8–10 marks**

The response:

- contains few errors
- shows a very good understanding of the question
- shows a good use of data or the information provided, where appropriate
- provides a balanced answer

Level two, 5–7 marks

The response:

- may contain some errors
- shows an adequate understanding of the question
- shows some use of data or the information provided, where appropriate
- may lack balance

Level three, 1–4 marks

The response:

- may contain errors
- shows limited understanding of the question
- shows little or no use of data or the information, where appropriate
- lacks balance

Section B descriptor levels:**level descriptors 2**

Responses:

Level one, 25–30 marks

- fulfil all the requirements of the question
- contain a very good understanding of the content required
- contain a very good balance of content
- contain substantial critical and supportive evaluations
- make accurate use of relevant vocabulary

Level two, 19–24 marks

- fulfil most of the requirements of the question
- contain a good understanding of the content required
- contain a good balance of content
- contain some critical and supportive evaluations
- make good use of relevant vocabulary

Level three, 13–18 marks

- fulfil some requirements of the question
- contain some understanding of the content required
- may contain some limited balance of content
- may contain brief evaluations
- make some use of relevant vocabulary

Level four, 6–12 marks

- fulfil limited requirements of the question
- contain limited understanding of the content required
- may contain poor balanced of content
- may not contain evaluations
- make limited use of relevant vocabulary

Section B descriptor levels:**Level five, 1–5 marks**

- fulfil a few requirements of the question
- contain a very limited understanding of the content required
- are likely to be unbalanced and undeveloped
- evaluative statements are likely to be missing
- make no use of relevant vocabulary