2226 – 4618M

Diploma Programme
Programme du diplôme
Programa del Diploma

Markscheme

May 2026

Environmental systems and societies

Higher level

Paper 2

18 pages

Subject details: Environmental systems and societies HLP2 Markscheme

Mark allocation

Candidates are required to answer:
- **ALL** questions in Section A **[40]** and **TWO** questions in Section B **[40]**.
- The maximum total = **[80]**.

1. Environmental systems and societies uses marking points and markbands to determine the achievement of candidates

When using marking points (<u>All of this paper except</u> Section B, part (c) questions):

i. A markscheme often has more marking points than the total allows. This is intentional
ii. Each marking point has a separate line and the end is shown by means of a semi-colon (;)
iii. Where a mark is awarded, a tick/check (✓) **must** be placed in the text at the **<u>precise point</u>** where it becomes clear that the candidate deserves the mark. **<u>One tick to be shown for each mark awarded</u>**
iv. The order of marking points does not have to be as in the markscheme, unless stated otherwise.

When using markbands (<u>Only</u> for Section B, part (c) questions):

i. Read the response and determine which band the response fits into
ii. Then re-read the response to determine where the response fits within the band
iii. Annotate the response to indicate your reasoning behind the awarding of the mark
Do not use ticks at this point
iv. Decide on a mark for the response
v. At the end of the response place the required number of ticks to enable RM Assessor to input the correct number of marks for the response.

2. An alternative answer or wording is indicated in the markscheme by a slash (/). Either wording can be accepted.

3. Words in brackets ( ) in the markscheme are not necessary to gain the mark.

4. Words that are <u>underlined</u> are essential for the mark.

5. If the candidate's answer has the same "meaning" or can be clearly interpreted as being of equivalent significance, detail and validity as that in the markscheme then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect).

6. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.

7. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forwar(d) on the script.

8. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the markscheme.

Section A

1. (a) Identify the primary consumer in the food chain shown in **Figure 1**. **[1]**

Animal plankton/zooplankton

(b) State **one** reason why PCB is biomagnified in food chains such as the one shown in **Figure 1**. **[1]**

a. It is non-biodegradable/chemically unstable/a POP/persistent organic pollutant;
b. Dissolves in fat/stored in adipose/fat tissue;
c. As trophic level increases, organisms consume larger amounts of contaminated biomass/high number of contaminated organisms/higher concentrations of PCB;

(c) Calculate the percentage change in PCB content between sea birds and marine mammals. **[1]**

((160 - 110) / 110 × 100 %) 45 (%)

Note to examiner: *Accept range between 45 and 45.5*

(d) Distinguish between biomagnification and bioaccumulation. **[2]**

a. bioaccumulation refers to the increasing concentration of (non-biodegradable /persistent) pollutants/toxins over time/as more are absorbed in a single organism/trophic level;
b. biomagnification refers to the increasing concentration of (non-biodegradable/persistent) pollutants/toxins along a food chain;
c. bioaccumulation happens when substances/(non-biodegradable/persistent) pollutants/toxins are absorbed faster than they are eliminated, while biomagnification happens because higher (trophic) levels consume many organisms from lower (trophic) levels;
d. in bioaccumulation, concentration increases with time/age of an organism, in biomagnification, concentration increases at higher trophic levels;
e. bioaccumulation directly affects an individual organism, whereas biomagnification results in the highest toxin levels in top predators.

(e) Suggest **two** disadvantages of using a pyramid to represent the biomass of organisms in the food chain shown in **Figure 1**. **[2]**

a. Pyramids of biomass show the standing crop per unit area at a particular time;
b. Do not show changes in time/seasonal changes;
c. Do not show the flow of energy between trophic levels;
d. Collecting data involves killing organisms, which may be considered unethical;
e. Data collection is difficult/time consuming/requires expertise;
f. Model so may miss detail/oversimplifies data/values approximate/based on estimated values;

(f) State **two** abiotic factors that can influence net primary productivity of the marine ecosystem in **Figure 1**. **[2]**

a. Sunlight/depth/turbidity;
b. Temperature;
c. Salinity;
d. Currents/upwellings;
e. Nutrient availability;
f. pH;
g. CO_2 concentration;
h. Pressure/buoyancy;

(g) Outline the reasons for energy losses between trophic levels in the food chain shown in **Figure 1**. **[4]**

a. No energy transfer is 100 % efficient/second law of thermodynamics/increase in entropy;
b. Only 10%/5-20% of energy is transferred /90% of energy is lost between trophic levels;
c. Energy lost due to respiration /Net productivity= Gross productivity - respiration / NP = GP - R;
d. Energy lost in a form of heat;
e. Energy is lost through excretion/in form of waste/faeces/not digested/not absorbed food;
f. Not all/all parts of available organisms in a trophic level are eaten;
g. Aquatic food chains tend to be more efficient than terrestrial in energy transfer between trophic levels;

(h) Suggest **two** difficulties of managing PCB pollution in marine ecosystems. **[2]**

a. PCBs are non-biodegradable;
b. seas and oceans are interconnected/vast areas making (PCB) pollution difficult to manage;
c. (PCB) pollution management requires international agreements/cooperation (which is hard to achieve);
d. the ‘high seas’ are owned by no-one, so laws and agreements are difficult to enforce;
e. contributes to tragedy of commons;
f. non-point pollution/has many sources/difficult to trace;
g. difficult/expensive to remove (as they settle on the seafloor);

2. (a) Describe the changes in the mean area of the ozone hole over the Antarctic between 1979 and 2024, as shown in **Figure 2**. **[2]**

a. overall increase over time/1979-2024;
b. Initial sharp increase until ca.1987/Montreal Protocol;
c. overall fluctuations at around 20 mln km2/reference to years;
d. Increase between 1979 and 2000;
e. ...and decrease between 2000 and 2024;
f. three major/extreme decreases (1988, 2002, 2019);

***Note to examiner**: Accept any other valid description of decrease/increase*

(b) Identify the year in which the mean area of the Antarctic ozone hole was at its greatest. **[1]**

2006

***Note to examiner:** Accept answers in the range between 2005 and 2006*

(c) The Montreal Protocol regulates the production, trade and use of chlorofluorocarbons (CFCs). Outline how CFCs affect the ozone hole. **[2]**

a. CFCs are released into the atmosphere from aerosols/broken/used appliances/refrigerators/air conditioners;
b. CFCs break down/decompose/react in UV light to release (highly reactive) free radicals/chlorine/halogens/ $CFCl_3$ (UV) → Cl + $CFCl_2$;
c. free radicals/chlorine/halogens breaks down/deplete stratospheric ozone/ Cl_2 + O_3 -> ClO + O_2;

(d) With reference to **Figure 2**, list **two** risks to human health which may have increased between 1979 and 2023. **[2]**

a. increased rate of mutation/damage to DNA;
b. skin cancer;
c. sunburns;
d. Cataracts/eye damage;
e. Premature aging of the skin;

***Note to examiner**: Do not accept effects of UV light of organisms other than humans*

(e) Discuss how efforts to promote the United Nations' Sustainable Development Goal 8 ("Decent work and economic growth") could contribute to the recovery of the ozone layer. **[4]**

a. Investment in cleaner technologies promotes transition to/use of alternatives of ozone-depleting substances/ODSs/CFC/HCFC;
b. Shifting to environmentally responsible production methods reduces use/emissions of ozone-depleting substances;
c. Economic incentives for sustainable business practices (e.g. tax benefits) may discourage companies from continuing ozone-harming activities;
d. building sustainable infrastructure reduces production/improves containment and handling of ODSs;
e. Growth in eco-tourism promotes decent employment/work (in places exposed to/threatened by ozone hole/depletion)…
f. …providing incentive for reducing reliance on ODSs/increasing ozone-friendly practices;
g. Education campaigns/training can raise awareness about ozone-friendly practices;
h. International cooperation (for sustainable economic growth) contributes to execution of environmental treaties regarding ozone protection/restoration (e.g. Montreal Protocol);
i. legislative oversight on ODS black market/illegal trade/smuggling, promotes law-biding ozone-friendly practices
j. Sustainable growth can stabilize economies, allowing more resources to be directed to ozone protection/restoration;

***Note to examiner**: Accept any other reasonable answer with a clear link to stratospheric ozone. Accept counterarguments. Do not credit responses referring to general strategies to limit GHG emissions/climate change.*

3. (a) With reference to **Figure 3**, identify **one** global element that is closest to reaching its tipping point. **[1]**

West Antarctic Ice Sheet/Greenland Ice Sheet/Labrador-Irminger Seas Convection

(b) With reference to **Figure 3**, predict **two** environmental impacts of the Greenland ice sheet reaching its climate tipping point. **[2]**

a. Tipping point results in accelerating/increasing loss of ice from ice-sheets…;
b. ….resulting in reduced albedo effect further enhancing global warming;
c. Melting of ice sheets increases sea-levels;
d. Which reduces salinity of the oceans…;
e. …slowing down ocean currents;
f. Accelerates coastal erosion/coastal flooding;
g. Disruption/loss of marine/tundra ecosystems/habitats;

***Note to examiner**: Accept any other valid impact.*

(c) Outline a positive feedback loop that could lead to Boreal permafrost collapse. **[2]**

a. Rising global temperature leads to melting/thawing of permafrost;
b. Melting of permafrost releases methane;
c. Methane is a greenhouse gas, which increases global temperatures;

***Note to examiner**: Accept a diagram for the answer. Do not accept albedo effect.*

(d) Distinguish between anthropocentric and technocentric approaches that could prevent the elements shown in **Figure 3** from reaching their climate tipping points. **[3]**

a. Technocentric approach based on technology and anthropocentric approach based on legislation/education/taxing/changing human behaviour;
b. Technocentric tends to keep producing and releasing CO_2 and clean up/remove it afterwards whilst anthropocentric tends to reduce emissions as well as remove CO_2;
c. Technocentric requires technology development which is expensive and anthropocentric strategies are cheaper;
d. Technocentric believes that technology will solve climate change problems in the future whilst anthropocentric tends to act here and now;
e. Anthropocentric supports an idea of taking responsibility for our future whilst technocentric tends to put responsibility on others;
f. Anthropocentric can be applied everywhere and technocentric is reserved for more economically/technologically advanced/wealthy nations;
g. Anthropocentric requires public participation whilst technocentric relies on experts;

***Note to examiner**: Allow [Max 1 mark] for a set of valid examples of technocentric and anthropocentric strategies to mitigate climate change*

4. (a) Suggest **two** reasons for the change in population in Shanghai, as shown in **Figures 4(a)** and **4(b)**. **[2]**

Pull factors to urban areas might include:

a. better employment opportunities;
b. better social benefits/close to friends/relatives;
c. better access to education;
d. better access to healthcare;

Push factors away from rural areas might include:

e. forced rural-urban migration;
f. drought/famine/loss of crops;

Note to examiner: *Accept push factors that are converse statements to the pull factors outlined. Do not credit factors leading to higher fertility/birth rates/lower mortality.*

(b) Describe **two** ways in which urban development, such as that presented in **Figures 4(a)** and **4(b)**, could affect the environment. **[2]**

a. loss of agricultural land/forests/natural ecosystems;
b. changes to water quality due to increased pressures/faulty sewage systems/pollution;
c. changing river flows which can affect aquatic species;
d. air pollution from industry/transportation/traffic;
e. habitat fragmentation/biodiversity loss due to building roads/ housing/infrastructure;
f. paved areas disturb/reduce water infiltration/cause runoff/flash floods/heat island effect;
g. reduced plant cover contributes to reduced evapotranspiration/carbon stores/sequestration;

(c) Outline **two** reasons why Shanghai, as shown in **Figure 4(b)**, is more prone to photochemical smog than smaller cities. **[2]**

a. Tall buildings trap emissions and smog/restrict air movement/wind;
b. Higher population (density) contributes to more transportation...;
c. ...which causes higher NOx emissions from burning fuel;
d. More industrial sites located in large cities causing more NOx and VOCs emissions;
e. More NOx from burning fossil fuels to heat densely located homes;

Section B

5. (a) With reference to **four** properties of water, describe how they support and sustain life. **[4]**

Polarity/cohesion/adhesion/solvent properties:
a. That allows plants transpiration/movement of water in xylem/uptake of water in roots;
b. allows transport within/between cells (in organisms);
c. Surface tension allows organisms to live/move on water surfaces;

Transparency:
d. Allows photosynthesis in water systems;
e. Allows animals to see in water;

High specific heat capacity:
f. Transfer energy in global systems/regulating climates;
g. allows to maintain temperature in living organisms/bodies of water;

High latent heat of vaporisation:
h. Allows removing heat through sweating/panting/transpiration;

Density depending on temperature:
i. Protective surface ice cover in winter aquatic ecosystems;
j. Preventing lower areas of water bodies from freezing;
k. Floating ice provides habitat for aquatic predators;

Gas solubility depending on temperature and pressure:
l. Allows gas exchange in water systems;
m. Removes CO_2 from the atmosphere reducing global warming;

***Note to examiner**: For credit, correct description must be linked to correct property.*

Accept other reasonable responses.

(b) Explain the role of ocean currents in climate regulation and atmospheric composition. **[7]**

a. ocean currents are formed due to different levels of solar radiation/water temperature/salinity levels/prevailing winds/distribution of pressure cells;
b. heat storage in oceans due to high heat capacity of water;
c. ocean currents transfer heat from equatorial regions to higher latitudes, helping regulate global temperatures/reduces extreme temperature differences between the equator and the poles;
d. warm currents raise temperatures in nearby coastal regions, while cold currents lower temperatures along adjacent coasts
e. coastal areas have smaller thermal amplitudes/temperature changes;
f. ocean currents influence climate patterns by affecting atmospheric pressure and wind systems;
g. warm ocean currents increase evaporation, leading to greater humidity and precipitation in some regions/cold currents reduce evaporation, often contributing to dry coastal climates and desert formation;
h. ocean currents influence the distribution and intensity of storms (e.g. warm waters contribute to tropical cyclones);
i. cold ocean waters can absorb more CO_2, affecting atmospheric composition/reducing greenhouse effect/global warming;
j. upwellings allow for more nutrients/photosynthesis/decreasing CO_2 levels/increasing O_2 levels;
k. ENSO-driven/El Nino/La Nina current changes affect global climate patterns/causes drought/flooding in different regions;

***Note to examiner**: [Max 1 mark] for the description of the origin of ocean currents, as the question focuses on the interaction between oceans and climate and atmospheric composition.*

(c) To what extent is legislation more effective than education in achieving water security? **[9]**

- understanding concepts and terminology: water security, economic development, water scarcity, water supplies, water conservation techniques, mitigation strategies, environmental laws, lobbing, environmental constitutionalizm, different perspectives (ecocentric, anthropocentric, education inputs, social media campaigns, ethics, moral…);

- breadth in addressing and linking: laws to control and regulate impact of urbanization and agricultural activities quality and availability of freshwater; sustainable management; overexploitation; impact of education on individual responsibilities and attitudes; food resources, political pressures, environmental movements;

- examples: range of water supplies (desalination, aquifers, reservoirs); water conservation techniques: domestic (dual-flush toilets, rainwater harvesting, greywater), in agriculture (drip irrigation, hydroponics); pollutants from urban and agricultural sources; strategies for sustainable management of water; countries/areas with water scarcity (Republic of South Africa, Colorado river, Israel), laws (Clean Water Act, EU Water Framework Directive, Singapore water conservation tax); international agreements and local agreements (SDG 6, Nile basin cooperation);

- balanced analysis evaluating the relative impact (negative or positive) of both legislation and education on water quality and availability and the extent to which these may be mitigated through sustainable management

- a conclusion that is consistent with and supported by analysis and examples given, e.g. Although legislation is generally more effective in achieving water security because it can control large-scale industrial and agricultural water use, education is still important for long-term behavioural change, so the most effective approach is a combination of both.

Please see markbands on page 18.

6. (a) Outline **four** different ways in which human activities impact the nitrogen cycle. **[4]**

a. Burning fossil fuels/transportation releases nitrogen oxides (NOx) into the atmosphere/contributes to acid rain/deposition;
b. Deforestation/land clearing increases nitrate leaching/run-off/reduces nitrogen storage in biomass;
c. Livestock farming increases ammonia/nitrogen emissions (to atmosphere/soil/water) through animal waste;
d. Use of fertilizers increases nitrogen uptake by plants/nitrogen store in biomass/nitrification/may contribute to leaching/run-off/eutrophication;
e. Cultivating legumes/GMOs increases nitrogen fixation/nitrogen stores in biomass;
f. Waterlogging/rice farming increases denitrification/release of nitrogen into atmosphere;
g. Sewage/urban run-off increases nitrates/nitrogen store in soils/water/may contribute to nitrification/eutrophication;
h. Landfills increase denitrification/release of nitrogen into atmosphere;
i. GHG emissions/enhanced greenhouse effect/global warming increase microbial activity/nitrification/denitrification;
j. Fertilizers production/Haber process removes nitrogen from the atmosphere;

Note to examiner: *Credit any valid human impact correctly linked to an impact on stores or flows in the nitrogen cycle.*

(b) Explain how the niche of a terrestrial predator could change due to the introduction of an invasive producer species. **[7]**

a. niche is the functional role/position of a species in an ecosystem/the way it obtains and uses resources/interacts with other organisms/contributes to energy flow and nutrient cycling/ *OWTTE;*
b. a fundamental niche is the full range of conditions/resources a species could potentially use, whereas a realized niche is the range it actually uses due to limiting factors;

Effects contributing to expanding niche of a predator:
c. more food/less competition for herbivores/primary consumers (increasing their population), so more food for predators;
d. more plant species might attract new herbivores/primary consumers, so more food for predators;
e. greater prey availability may allow the predator to use a wider range of hunting times/strategies;
f. more vegetation/increased habitat complexity can create more hunting opportunities/e.g. ambush hunting;

Effects contributing to decreasing niche of a predator:
g. the invasive producer species may compete with/outcompete native plants reducing their population...;
h. ...less food for herbivores/lower herbivore diversity, so less food for predators;
i. ... lower population of native species means less nesting sites/burrows/shelter for herbivores reducing their population so less food for predators;
j. more/denser vegetation may increase hiding opportunities for herbivores so more difficult for predators to hunt/reduced capture rates;
k. changes in habitat structure may favour other predators, increasing competition;

(c) "The ecological footprint of a society following a plant-based diet is likely to be smaller than that of a society in which meat is eaten." Discuss this statement. **[9]**

- **understanding concepts and terminology** ecological footprint, carbon footprint, greenhouse gas emissions, methane emissions from livestock farming, (plant-based) agriculture, aquaponics, GMO, land use efficiency, trophic level energy loss, energy transfer in food chains, deforestation for pasture land, water footprint, eutrophication, fertilizer runoff, pesticide use, habitat destruction, soil degradation, sustainable agriculture, food security,

- **breadth in addressing and linking** Different food production systems (intensive livestock farming, monoculture, organic agriculture) and their use of energy, water, fertilizers; energy transfer efficiency through trophic levels, greenhouse gas emissions such as methane and carbon dioxide, land use change including deforestation and pasture expansion, waste production such as manure, biodiversity impacts from habitat loss and monocultures, soil degradation and erosion;

- **examples** pulse/lentil farming in Canada, greenhouse vegetable farming in the Netherlands with low EF vs. monoculture soybean or rice cultivation; rotational grazing systems in Australia, free-range poultry farming with low EF vs. beef cattle ranching in Brazil, intensive feedlot cattle farming in the United States

- **balanced analysis** both sustainable and unsustainable agricultural and livestock practices, e.g. plant-based societies low EF linked to lower energy loss, land use, and greenhouse gas emissions, their high EF linked to intensive monoculture farming, irrigation; meat-based societies high EF linked to methane emissions and high land and water use, their low EF linked to extensive grazing and local small-scale production

- **a conclusion that is consistent with and supported by analysis and examples given**, e.g. *Overall, plant-based societies generally have smaller ecological footprints because food production at lower trophic levels is usually more resource-efficient, however, unsustainable crop systems and sustainable livestock systems can reduce the difference between the two.*

Please see markbands on page 18.

7. (a) Outline the relationships between the different levels of biodiversity. **[4]**

Definitions [2 max]:
a. Biodiversity includes species, habitat and genetic diversity;
b. Species diversity is the number of species per unit area/includes richness, abundance and evenness;
c. Habitat diversity is the range of different habitats/niches in an ecosystem;
d. Genetic diversity is the range of genetic material present in a population;

Relationships:
e. Higher genetic diversity increases species diversity through increasing survival chances/resilience/allowing better adaptations/speciation;
f. Higher species diversity may maintain genetic diversity through reducing competition/selection pressures;
g. Higher species diversity increases habitat diversity/stability through creating more complex ecological interactions;
h. Higher habitat diversity increases species diversity through providing wider range of niches;
i. Higher habitat diversity increases genetic diversity through diversifying selection pressures/allowing different adaptations;

***Note to examiner**: accept converse statements on lack or lower genetic/species/habitat diversity, with an appropriate link between levels of diversity*

(b) Explain how different methodologies can be used to analyse the impact of mining activity on plant biodiversity in a named ecosystem. **[7]**

a. Assessment of plant biodiversity should be done before and after human activity/in proximal and distal positions from activity;
b. ...to prove human/mining impact on plant biodiversity/exclude other factors/variables influence (e.g. diseases, pests);
c. Quadrat sampling may be used to record number/abundance of plant species;
d. ...quadrats placed randomly/systematically in mined and unmined areas/along a transect moving away from the mine;
e. ...repeat multiple times (to increase reliability);
f. ...Calculate Simpson's (diversity) index/use formula $D=N\ (N-1)/\Sigma\ n(n-1)$/Shannon index/other appropriate index;
g. ...calculate overall/species percentage cover;
h. Transect sampling may be used to assess change with distance from the mine;
i. ...plant species recorded at regular intervals along a line or belt;
j. ...allows for identification of edge effects (location);
k. citizen science can be used for identification of plant species richness/evenness/diversity;

***Note to examiner:** [5 max] if no named ecosystem. Accept any other relevant measurements. Do not credit Lincoln index.*

(c) To what extent is biodiversity loss driven by economic development? **[9]**

- **understanding concepts and terminology** Different economic development, industrialization, urbanization, population growth, resource extraction, mining, deforestation, intensive agriculture, overfishing, habitat destruction/fragmentation, pollution, climate change, overexploitation, biodiversity, ecological footprint, tragedy of the commons, environmental accounting, high-income countries, low-income countries, ecological economics, sustainable development, conservation strategies, ecotourism, sixth mass extinction event.

- **breadth in addressing and linking** industrialization leading to habitat loss, pollution through industries, urbanization causing habitat loss/fragmentation, population growth increasing demand for land and resources, intensive agriculture/monocultures/pesticides decreasing biodiversity, mining/resource extraction destroying habitats, hunting and overfishing, weak environmental governance allowing unsustainable resource use, short-term economic profit driving continued biodiversity loss; low-income/high-income countries prioritizing economy over environment, high-income countries can afford conservation, impacts on biodiversity unrelated to economic growth; human population growth increases demand on basic necessities driving biodiversity loss, economic activities that require biodiversity, such as ecotourism, forestry, green economy initiatives.

- **examples** deforestation in the Amazon Rainforest for gold mining/cattle ranching/soya production, palm oil expansion in Indonesia causing habitat loss for the orangutan, intensive agriculture/pesticide use in the United States- monarch butterfly/Bald eagle, overfishing in the North Sea reducing populations of the Atlantic cod, Three Gorges Dam in China- flooding vast riparian area, Coal mining in biodiverse regions of Appalachia, Counter-examples may include: Bhutan- Gross National Happiness(GNH) and Biodiversity, Rwandan Gorilla Economy-national economic strategy around conserving mountain Gorilla, Payment for Ecosystem services in Costa-Rica, Ecuador-debt for nature swap protecting Galápagos Islands, etc.

- **balanced analysis** human activities linked to economic development often reduce biodiversity due to habitat destruction, pollution, and overexploitation; scale and severity vary depending on the type of activity and level of regulation. Sustainable development-driven activities -ecotourism, sustainable resource management may increase/maintain biodiversity.

- **a conclusion that is consistent with and supported by analysis and examples given**, e.g. *, for e.g. "Economic development is one of the dominant but not the sole driver of biodiversity loss. The mechanisms that drive habitat destruction, overexploitation, pollution, and climate change are responsible for the vast majority of global biodiversity loss. However, the relationship is neither simple nor inevitable. Through appropriate incentives, robust governance, and ecotourism initiatives, development and biodiversity can coexist and even reinforce one another.".*

Please see markbands on page 18.

Section B, part (c) markbands

Marks	Level descriptor
0	The response does not reach a standard described by the descriptors below and is not relevant to the question.
1–3	The response contains: • minimal evidence of knowledge and understanding of ESS issues, concepts or HL lenses content • fragmented knowledge statements poorly linked to the context of the question • some appropriate use of ESS terminology • no examples where required, or examples with insufficient explanation/relevance • superficial analysis that amounts to no more than a list of facts/ideas • judgments/conclusions that are vague or not supported by evidence/argument.
4–6	The response contains: • some evidence of sound knowledge and understanding of ESS issues, concepts and HL lenses content • knowledge statements effectively linked to the context of the question • largely appropriate use of ESS terminology • some use of relevant examples where required, but with limited explanation • clear analysis that shows a degree of balance • some clear judgments/conclusions, supported by limited evidence/arguments.
7–9	The response contains: • substantial evidence of sound knowledge and understanding of ESS issues, concepts and HL lenses content • a wide breadth of knowledge statements effectively linked with each other, and to the context of the question • consistently appropriate and precise use of ESS terminology • effective use of pertinent, well-explained examples, where required, showing some originality • thorough, well-balanced, insightful analysis • explicit judgments/conclusions that are well-supported by evidence/arguments and that include some critical reflection.