

Markscheme

May 2026

Environmental systems and societies

Standard level

Paper 1

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Subject details: Environmental systems and societies SLP1

Markscheme

Mark allocation

Candidates are required to answer:

- **ALL** questions
- The maximum total = **[35]**.

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

When using marking points:

- 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 **precise point** where it becomes clear that the candidate deserves the mark. **One tick to be shown for each mark awarded**
 - iv. The order of marking points does not have to be as in the markscheme, unless stated otherwise.
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 underlined 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 forward) on the script.
 8. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the markscheme.

1. (a) With reference to **Figure 1(d)**, identify the warmest month in the Corbieres Fenouilledes Nature Park [1]

July;

- (b) With reference to **Figure 1(d)** and **Figure 1(e)**, identify the biome present in the Corbières-Fenouillèdes Natural Park. [1]

Mediterranean;

Accept Desert as this would indicate erratum notice not read out.

Note to examiner: If multiple answers are given, only mark the first one.

2. (a) Using **Figure 1(f)** and **Figure 1(g)**, identify **two** factors which make the Corbieres Fenouilledes region important for conservation [2]

- a. (High levels of) endemic species found here;
- b. Unique and diverse range of habitats;
- c. High levels of plant biodiversity;
- d. (several) large, undisturbed areas with low human impact;
- e. Fragile ecology/ecosystems;
- f. Six conservation areas are already protected by French law SACs (special areas of conservation);
- g. A variety of ecological services (eg, carbon sequestration);
- h. Traditional farming/agricultural practices are important for social and cultural value;
- i. (several) languages found;
- j. opportunities for education/ecotourism as a popular tourist destination.

Allow an example of a species being protected/conserved. E.g. orchids

Note to examiner: Accept only the first two answers given.

- (b) Describe **two** values of orchids as a form of natural capital. [2]

- a. Intrinsic value as a species;
- b. monetary value for trade or sale;
- c. Ecosystem/habitat; value as plants that can produce food for pollinators;
- d. aesthetic value as an ornamental flowering plant;
- e. Cultural value as they can be used in traditional medicine;
- f. Tourism/ecotourism as people are interested in orchids generating economic value to the local region;
- g. Spiritual value as some cultures consider them of high importance;

3. (a) Using **Figure 1(h)**, state **two** environmental impacts of wine production in the Corbières-Fenouillèdes Natural Park. [2]

- a. Release of CO₂ to the atmosphere from vehicles/transport;
- b. Release of CO₂ from electricity production;
- c. Use of water during bottling;
- d. Use of water for pesticides;
- e. Use of pesticides on natural ecosystem;

Note to examiner: Accept any other reasonable suggestion.

Do not accept use of water irrigation .

Do not accept just 'carbon dioxide emissions.'

Do not accept 'for eutrophication' since fertilizer is not mentioned in Figure 1h.

Accept only the first two answers given.

- (b) Suggest **one** method by which carbon footprints and **one** method by which water footprints could be lowered during wine production. [2]

Carbon footprint	Electric tractors to reduce fossil fuel use; Less fertilizer use through green manure to improve soil structure; Switch to sources of renewable energy for electricity supply; Practice no-till land/subsistence farming management; Use lighter weight packaging/alternative packaging; Decrease use of agricultural vehicles; Use subsistence farming methods/traditional hand harvesting of grapes;
Water footprint	Terracing to reduce run off; drip irrigation to reduce run off/evaporation; plant on north facing slopes to reduce evaporation; use wind break to prevent evaporation; Use recycled/grey water systems; Plant drought resistant varieties of grapes; Use less water for pesticides;

Note to examiner: 1 mark max per footprint. Do not accept single word answer.

Accept only the first answer in each box.

Do not accept carbon capture/carbon storage/legislation to reduce wine production.

Do not accept just 'cleaner energy sources.'

Accept other acceptable answers.

4. (a) With reference to **Figure 2(a)**, **Figure 2(b)** and **Figure 2(c)**, outline **three** ways in which water quality could be measured in Lac sur l'Agly [3]

- a. Measure turbidity/suspended solids using a Secchi disk/turbidity tube
- b. Measure oxygen/dissolved oxygen using probes;
- c. Measure pH using probes/pH strips
- d. Measure nitrates/phosphate using probes/chemical tests
- e. Identify indicator species using keys/apps.
- f. Quantify impact on living organisms using biotic indices;
- g. Measure Biological Oxygen Demand (BOD) using the Winkler titration/incubation/probe method;
- h. Detect heavy metals using chemical spectrometry.
- i. Measure water temperature using a thermometer/temperature probe;
- j. Detect algal blooms/bacteria presence using growth media/microscopy/cell counts;

Note to examiner: Response must contain the variable being measured and how (technique) to gain the mark.

Accept only the 1st three answers outlined.

- (b) Identify **one** advantage and **one** disadvantage of the construction of the dam on the river Agly. [2]

Advantage: [Max 1]

- a. Can increase freshwater supply / ensure water supplies are constant with less rain in winter;
- b. can be used to generate electricity/for hydroelectric power;
- c. water reservoir can provide recreational opportunities (i.e. boating, kayaking, fishing, etc.);
- d. can prevent floods (in the winter);

Disadvantage: [Max 1]

- a. Dam may prevent or alter fish migrations;
- b. Loss of habitat can result from dam construction/flooding to create reservoir;
- c. May cause a buildup of organic matter causing methane emissions/algal blooms/ eutrophication;
- d. Loss of downstream nutrient flow can decrease fertility downstream;

Note to examiner: Do not accept hydroelectric dams reduce GHG emissions compared to burning fossil fuels.

Do not accept high cost of dam construction.

Accept only the 1st answer for an advantage and a disadvantage.

5. (a) With reference to **Figure 3(a)**, state the main source of energy used in France. [1]

Nuclear;

- (b) With reference to **Figure 3(a)** and **Figure 3(b)**, suggest how France could lower its carbon footprint through changes in its energy mix, energy conservation and energy efficiency.

[3]

Energy mix [1 max]	Lower dependency on/reduce/burn less fossil fuels/coal/oil/gas (methane); Increase nuclear/solar/wind/hydropower/other renewables;
Energy conservation [1 max]	Change behaviour/educate/campaigns to reduce energy consumption; Improve home insulation to reduce heat loss; Turn off lights/devices when not in use/do not leave appliances on standby; Reduce the use of heating/air conditioning; Less transportation from fossil fuel vehicles/use alternative, electric/hybrid vehicles/public transport/walk/bike;
Energy efficiency [1 max]	Promoting insulation to conserve heating or cooling costs; More energy efficient (domestic) appliances; More energy efficient/low energy lighting e.g., LED; Waste reduction through recycling programs; Smart meters/controls to monitor energy usage;

6. (a) With reference to **Figure 4(a)**, calculate France's natural increase rate.

[1]

$NIR = (\text{Birth rate} - \text{Death rate}) = (9.7 - 9.55) = 0.15 \text{ per } 1000$; Convert to percentage = $0.15/10 = 0.015\%$

Accept 0.1 - 0.15 out of 1000; 0.015%; 0.01%

Note to examiner: If student has rounded 9.55 to 9.6, accept 0.015 per thousand or 0.01%; units or working not required for the mark.

- (b) With reference to **Figure 4(b)**, identify France's stage on the Demographic Transition Model (DTM)

[1]

Stage 4 (Low/stationary/stable/lowest stage);

Note to examiner: Birth and death rates are low. Population is expanding slowly. Most of France's population are aged 25–64.

7. (a) With reference to **Figure 5(a)**, sketch a food chain with **four** trophic levels. [2]

Producer → primary consumer → secondary consumer → tertiary consumer

Note to examiner: Award 1 mark for appropriate names from **Figure 5(a)** in the same food chain and 1 mark for arrows correctly pointing towards higher trophic level.

Do not accept 'oak → rabbit' [as this is not supported by 5(a)].

- (b) Using **Figure 5(b)**, outline the effect of Coypu on the ecosystem of the region. [3]

- Competition for habitat with other secondary consumers;
- Ecological management;
- May out compete other primary consumer species for food/space/resources;
- As a food source for Eurasian Eagle-owl/vulture reducing feeding pressure on boar/rabbit/mice;
- By feeding on producers, the Coypu reduces food availability to other species/reduces species diversity/impacts threatened species;
- Impacting succession/successional processes in wetlands (e.g. feeding on seedlings/plants, burrowing, etc.);
- The burrows can increase (riverbank) erosion/cause reduced water quality/higher turbidity;
- Coypus are the only animals to eat cattails and, as such, keep the plant from spreading too much;

8. (a) With reference to **Figure 6(a)** and **Figure 6(b)**, identify the process and stage in wine making that might contribute most significantly toward ozone formation. [1]

Process: Burning biomass	Stage: Grape Production
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Note to examiner: Both answers must be correct to gain the mark.

- (b) With reference to **Figure 6(c)**, justify whether composting, changing bottle type or changing water irrigation is the more effective method for increasing the sustainability of farming grapes to produce wine in the south of France.

[2]

Composting as most sustainable strategy:

- a. It reduces photochemical ozone formation, *PM* and/or climate change the most significantly;
- b. has added values compared to incineration of biomass by providing habitat and increases soil organic content;

Accept other example of positive value of composting (i.e. increases circular economy/supports local biodiversity/reduces waste entering landfill)

Lighter bottle as most sustainable strategy:

- c. It reduces ocean acidification the most significantly;
- d. Lighter bottles use less raw materials;
- e. Lighter bottles require less energy to manufacture and transport;

Halving irrigation water as the most sustainable strategy:

- f. The region is susceptible to drought;
- g. Reducing water consumption could increase water security and reduce stress on natural resources and cause the price of wine to increase;

Note to examiner: *Accept specific references to graphed data.*

9. Using **Figure 7(b)**, **Figure 7(d)** and **Figure 7(e)**, evaluate a **named** conservation strategy to protect the Egyptian vulture. [6]

Named Strategy: [1mark]

In situ conservation/national park/protected areas/biosphere reserve;

Ex situ conservation/zoos/safari parks/sanctuaries;

In situ conservation/national parks/protected areas/biosphere reserve strategy – Pro [2 max]

- a. Helps maintain and preserve entire ecosystem/natural processes;
- b. The European Union Natura 2000 protected areas provide feeding stations for vultures;
- c. Ensures food stability/safety;
- d. It supports genetic diversity of vulture by allowing them to thrive in natural habitat;
- e. Allows vultures to exhibit natural behaviours, aiding survival and adaptation;
- f. Has long term viability, reducing risk of extinction;
- g. It engages with the local community/educates people/creates ecotourism opportunities;
- h. Vulture populations can be monitored with GPS trackers supporting scientific research;
- i. It maintains natural behaviour or ecological service of scavenger/decomposer in the food web;
- j. Increasing number of breeding pairs of vultures since the year 2000;

Accept 'government legislation' if a 'named conservation strategy' is specified (e.g. Endangered Species Act (ESA), banning toxic veterinary drugs, European Union Natura 2000 programme, set protected areas aside).

In situ conservation/national parks/protected areas/biosphere reserve strategy – Con [2 max]

- k. Vultures are vulnerable to outside threats and risk of depredation;
- l. The vultures are still at risk of accidental/illegal poisoning from dead animal carcasses;
- m. Greater competition for resources;
- n. Still vulnerable to threats such as pollution/pesticides;
- o. maintaining protected areas can be resource intensive;

Ex situ conservation/zoos/safari parks/sanctuaries strategies – Pro [2 max]

- p. Vultures are protected from threats such as poisoning/poaching/predators/lack of food;
- q. Captive breeding can be highly efficient at rearing young chicks with a decreased mortality rate for young life stages;
- r. Directly engages public through rewilding effort since it requires educational training of staff;
- s. Allows careful monitoring to facilitate recovery of vulture population;
- t. Captive breeding programs can help with reintroduction of vulture to wild population;

Ex situ conservation/zoos/safari parks/sanctuaries strategies – Con [2 max]

- u. Difficult to re-introduce captive breed vultures into the wild as they lack survival skills;
- v. Does not solve the problem of vulture biodiversity/habitat loss/risk of poisoning;
- w. Expensive to upkeep program;
- x. Risk of genetic inbreeding can occur from time in captivity;
- y. May lead to limited behaviours due to restricted habitat;
- z. Vulture may suffer stress or poor health due to confinement;

Named strategy: [1 mark]

Pros: [2 max]

Cons: [2 max]

Accept a 'mixed conservation approach'

Appraisal: General summary with a strength and limitation [1 max]