SimpleStudy

PRACTICE MARKING SCHEME

LEAVING CERTIFICATE · HIGHER LEVEL · SAMPLE PAPER 2 · 2027

Climate Action and Sustainable Development

Total marks	Duration	Sections
300	2h 30m	A · B · C

About this document

A practice marking scheme produced by SimpleStudy to help students and teachers prepare for the Leaving Certificate examination in Climate Action and Sustainable Development.

Not an official State Examinations Commission document.

Marking Scheme

This marking scheme accompanies SimpleStudy's Sample Paper 2 in Climate Action and Sustainable Development. It is intended to support candidates and teachers preparing for the Leaving Certificate examination in this subject. It is not an official State Examinations Commission document.

General Marking Guidelines

- Accept all reasonable responses not explicitly listed in this scheme.
- Award marks for relevant content even if poorly expressed.
- Do not penalise for poor spelling or grammar unless meaning is unclear.
- Where a candidate contradicts themselves, award the lower mark.
- A named example is required where specified — no marks without one.
- For diagrams: credit accurate labelling and correctness of representation.

Paper Structure

Section A	**60 marks**	There is one question in this section, answer all parts of this question.
Section B	**160 marks**	Answer any four questions in this section. Each question carries 40 marks.
Section C	**80 marks**	Answer one question in this section. Each question carries 80 marks.

Grading Descriptors (Sections B and C)

High (H)	Accurate, well-developed, specific and relevant.
Mid (M)	Mostly accurate, some development, relevant.
Low (L)	Partially accurate, limited development, broadly relevant.

Section A — 60 marks

There is one question in this section, answer **all** parts of this question.

Question 1 (60 marks) — Answer ALL parts

(a) Greenhouse effect — Figure 1 matching. *(12 marks)*

> *4 marks per correct match × 3 remaining = 12 marks. Label A (Earth re-emits infra-red) is pre-completed and carries no marks.*

Part	Acceptable Answer(s)	Marks
Label B ***4 marks***	The sun's energy that is not absorbed by the atmosphere reaches the Earth's surface, where some is absorbed. **B** is the arrow showing solar radiation passing through the atmosphere and reaching the surface. Accept any phrasing that captures solar energy reaching the Earth's surface after passing through the atmosphere.	**4**
Label C ***4 marks***	Some of the energy re-emitted by the Earth passes directly through the atmosphere. **C** shows infra-red radiation escaping to space without being trapped by greenhouse gases. Accept equivalent descriptions.	**4**
Label D ***4 marks***	Some of the energy re-emitted by the Earth is trapped in the atmosphere by greenhouse gases. **D** shows infra-red radiation being absorbed and re-emitted back toward Earth by greenhouse gases. Accept equivalent descriptions of the trapping mechanism.	**4**

(b) Natural factors and their effects on Earth's climate — matching. *(12 marks)*

4 marks per correct match × 3 remaining = 12 marks. Volcanic eruptions (D) is pre-completed. Accept any response that correctly identifies the mechanism described.

Part	Acceptable Answer(s)	Marks
Formation of oceans (B) ***4 marks***	**This absorbed CO_2 and global temperatures decreased as a result.** The formation of oceans allowed CO_2 to dissolve into seawater, reducing atmospheric CO_2 concentrations and lowering global temperatures.	**4**
Evolution of green algae and plants (A) ***4 marks***	**This released oxygen and absorbed CO_2 and global temperatures decreased.** Photosynthesis by early green algae and land plants removed CO_2 from the atmosphere and released O_2, fundamentally changing atmospheric composition and reducing the greenhouse effect.	**4**
Formation of fossil fuels (C) ***4 marks***	**This locked carbon away, reducing CO_2 in Earth's atmosphere and global temperatures decreased.** Over millions of years, dead organic matter was buried and compressed into coal, oil, and gas, removing carbon from the active carbon cycle and lowering atmospheric CO_2.	**4**

(c) Three demands aligned with a global climate justice campaign. *(12 marks)*

4 marks per correct selection × 3 = 12 marks. Award marks for each correct selection made. Do not award marks for incorrect selections. If a candidate ticks more than three boxes, award marks only for the correct ones within their selection.

Part	Acceptable Answer(s)	Marks
Correct ×3	**(i) Significant reductions in greenhouse gas emissions in the Global North.** Climate justice recognises that wealthy industrialised nations are historically most responsible for cumulative emissions and must therefore make the deepest cuts. **(ii) Payment of ecological debt to countries of the Global South.** Wealthy nations owe reparation for the environmental damage caused by their industrialisation, which has disproportionately harmed nations that contributed little to the crisis. **(iii) A key role for indigenous communities in making climate change decisions at UN conferences.** Climate justice demands meaningful participation of frontline and indigenous communities — those most affected — in decision-making. *Do NOT accept:* (iv) Equal reductions by all countries — this ignores common but differentiated responsibilities and would be unjust to the Global South. (v) Repayable loans with interest — this is the opposite of justice; it burdens vulnerable nations with debt.	**4 + 4 + 4**

(d) Atmospheric CO_2 at Mauna Loa — Figure 2. *(8 marks)*

The safe level shown on the graph is 350 ppm — this is the commonly cited safe level drawn from scientific and climate advocacy discourse (associated with James Hansen and others), shown as a dashed line in Figure 2. It is not an official IPCC threshold. Accept ±2 years for (d)(i) based on visual graph reading. The 2024 measurement is given as 424.6 ppm.

Part	Acceptable Answer(s)	Marks
(d)(i) ***4 marks***	**Approximately 1988–1990** (accept any year in the range 1987–1992 based on graph reading). The CO_2 line crosses the 350 ppm safe level in the late 1980s. Award full marks for any year within the acceptable reading range.	**4**
(d)(ii) ***4 marks***	**424.6 − 350 = 74.6 ppm** *Calculation:* 2024 measurement (424.6 ppm) minus safe level (350 ppm) = 74.6 ppm above safe level. Award 2 marks for correct method (subtraction of safe level from 2024 value) + 2 marks for correct answer. Accept 74.6 ppm or equivalent. If the candidate uses a slightly different safe level value read from the graph, apply follow-through marking.	**4**

(e) Examples of direct action — matching. *(12 marks)*

4 marks per correct match × 3 remaining = 12 marks. Boycott (D) is pre-completed and carries no marks.

Part	Acceptable Answer(s)	Marks
Civil disobedience (C) ***4 marks***	People knowingly breaking or ignoring a law to bring attention to and bring about social change or a change in law. *e.g.* Extinction Rebellion blocking bridges; suffragettes refusing to pay taxes; anti-apartheid activists ignoring segregation laws.	**4**
Community organising (A) ***4 marks***	Collaborative activity where people build relationships and work together in a local area or group to change a situation themselves. *e.g.* Residents forming a local climate action group; Cloughjordan Ecovillage community organising around energy and housing.	**4**
Creating alternatives (B) ***4 marks***	Establishing new initiatives, organisations, businesses, culture or other solutions to meet the needs of society or the environment. *e.g.* Setting up a community energy co-operative; creating a repair café; founding a social enterprise focused on sustainable food.	**4**

(f) Define colonialism. *(4 marks)*

Award up to 4 marks. 2 marks for a basic definition; 2 additional marks for development or contextualisation. A brief, clearly expressed definition is sufficient.

Part	Acceptable Answer(s)	Marks
4 marks	**Definition:** The practice by which a powerful nation extends control over other territories or peoples, establishing political, economic, and cultural dominance over them — typically exploiting their resources and labour for the colonising nation's benefit. **Development:** Colonialism involved the forced subjugation of peoples, extraction of natural resources, suppression of local cultures and governance, and the imposition of the coloniser's language, religion, and economic systems. Its legacies continue to shape global inequality today, including vulnerability to climate change.	**4**

(g) True or False — economic approaches. *(6 marks)*

2 marks per correct answer × 3 = 6 marks. No partial marks.

Part	Acceptable Answer(s)	Marks
(g)(i) ***2 marks***	**FALSE** Degrowth challenges the idea that decoupling economic growth from environmental harm is sufficient or achievable at the scale required. Rather than seeking to decouple, degrowth advocates for a planned reduction in economic throughput in wealthy nations, prioritising human wellbeing and ecological limits over GDP growth. The statement is false because degrowth does not "emphasise decoupling" — it critiques that concept as inadequate. *(Note: decoupling is associated with green growth or ecological modernisation theory, not degrowth.)*	**2**
(g)(ii) ***2 marks***	**FALSE** Doughnut Economics (Kate Raworth) encourages human activity to remain within social and planetary boundaries — not to exceed them. The "doughnut" represents a safe and just space between the social foundation (a minimum standard of living for all) and the ecological ceiling (planetary limits that must not be breached).	**2**
(g)(iii) ***2 marks***	**FALSE** The Circular Economy is the opposite of what is described. It encourages keeping products, materials, and resources in use for as long as possible through reuse, repair, remanufacturing, and recycling — specifically to avoid dumping and the purchase of unnecessary new products.	**2**

(h) Climate justice movement in the Global North. *(8 marks)*

4 marks for naming a valid climate justice movement studied + 4 marks for stating one clear demand. Accept any movement from the CASD course that is based in the Global North.

Part	Acceptable Answer(s)	Marks
(h)(i) ***4 marks***	Any ONE named climate justice movement based in the Global North studied in the CASD course, e.g.: • Fridays for Future (global, originated in Sweden / Global North) • Extinction Rebellion (XR) (UK / global) • Stop Fossil Fuels / Just Stop Oil (UK) • Sunrise Movement (USA) • Climate Justice Coalition (Ireland) • Any other valid, named movement with a Global North base.	**4**
(h)(ii) ***4 marks***	One demand appropriate to the named movement, e.g.: **Fridays for Future:** Immediate and drastic cuts to greenhouse gas emissions in line with 1.5°C pathway; climate justice for the Global South. **Extinction Rebellion:** Government to tell the truth about the climate emergency; achieve net-zero carbon emissions by 2025; establish a Citizens' Assembly on climate. **Just Stop Oil:** No new oil and gas licences in the UK. **Sunrise Movement:** A Green New Deal providing clean energy jobs and climate justice. Accept any clearly stated, specific demand that is coherent with the named movement.	**4**

(i) Three other examples of data used as evidence for human-induced global warming. *(6 marks)*

> *Historical testimony is already given in the question — do not accept this again. Award 2 marks per valid example × 3 = 6 marks. Accept any scientifically valid data type clearly linked to evidence of human-induced warming.*

Part	Acceptable Answer(s)	Marks
3 examples ***2 marks each***	Any THREE of the following (or other valid scientific data types): • **Ice core data** — bubbles of trapped air show CO_2 and temperature changes over hundreds of thousands of years; the post-industrial spike in CO_2 is unprecedented. • **Direct temperature records** — global surface temperature datasets (NASA GISS, HadCRUT, Met Éireann) show a clear warming trend since industrialisation. • **Sea level rise measurements** — satellite and tide gauge records showing accelerating sea-level rise consistent with warming. • **Ocean heat content data** — measurements showing oceans absorbing increasing amounts of heat energy. • **Arctic / Antarctic ice extent data** — satellite records of shrinking sea ice and ice sheet mass loss. • **Atmospheric CO_2 measurements** — Keeling Curve (Mauna Loa) showing continuous rise in CO_2 from ~315 ppm (1958) to 424+ ppm (2024). • **Glacier retreat records** — photographic and measurement evidence of global glacier recession. • **Phenological data** — shifts in seasonal timing of plant flowering, bird migration, etc., consistent with warming. • **Ocean acidification data** — measurements of decreasing seawater pH consistent with increased CO_2 absorption.	**2 + 2 + 2**

(j) Coral reef ecosystem change — Figures 3 and 4. *(8 marks)*

Part	Acceptable Answer(s)	Marks
(j)(i) ***4 marks***	**Biosphere** The scenario describes living organisms (fish, coral, algae) interacting with each other in an ecosystem — this is the biosphere. The biosphere encompasses all living organisms on Earth and their interactions. Geosphere, Atmosphere, and Cryosphere are not relevant here.	**4**
(j)(ii) ***4 marks***	Any ONE clearly stated way that biodiversity in Figure 4 (degraded reef) differs from Figure 3 (healthy reef), e.g.: • Figure 4 has lower fish diversity / abundance than Figure 3 due to overfishing causing fish population decline. • Figure 4 is dominated by algae rather than coral, reducing habitat complexity and the variety of species the reef can support. • Figure 4 has dead or dying corals, so species that depend on coral for shelter and food are absent or reduced. • Figure 3 supports a greater variety of species (higher biodiversity) due to the healthy coral providing complex habitat structure. Accept any response that identifies a clear, specific difference in biodiversity between the two figures.	**4**

Section B — 160 marks

Answer any **four** questions in this section. Each question carries 40 marks. Candidates answer all parts of whichever four questions they choose.

Question 2 — Carbon Cycle, Greenhouse Effect and Just Transition (40 marks)

(a) Carbon cycle — Figure 5. *(14 marks)*

(a)(i) Identify the cycle shown in Figure 5. *(2 marks)*

Part	Acceptable Answer(s)	Marks
2 marks	**The Carbon Cycle** (also accept: carbon/oxygen cycle, biogeochemical carbon cycle).	**2**

(a)(ii) List two carbon sinks shown in Figure 5. *(4 marks — 2 per sink)*

> *A carbon sink absorbs more carbon than it releases. The diagram shows sinks with downward arrows (blue). Accept any two of the following visible in Figure 5.*

Part	Acceptable Answer(s)	Marks
2 sinks ***2 marks each***	Any TWO of the carbon sinks shown in Figure 5: • **Oceans** — absorb CO_2 from the atmosphere • **Plants / vegetation** — absorb CO_2 through photosynthesis • **Wetlands** — store carbon in waterlogged organic matter • **Soil / carbon in decomposition** — organic carbon stored in soil acts as a sink where inputs exceed outputs • **Carbon in the ground** (soil, fossils, oil, gas) — accept as a long-term carbon store; note that fossil fuels are not an active sink (they do not currently absorb carbon) but are shown in Figure 5 as a store of carbon. *Do not accept carbon sources (fossil fuel emissions, agriculture, fire, volcanoes, animals) as sinks.*	**2 + 2**

(a)(iii) Explain how ONE carbon source in Figure 5 releases carbon into the atmosphere. *(8 marks)*

3 marks for identifying and naming the source + 5 marks for explaining the process by which carbon is released. Must choose a source shown in Figure 5.

Part	Acceptable Answer(s)	Marks
8 marks	Accept any ONE carbon source shown in Figure 5 with a clear explanation of the release mechanism. Examples: **Fossil fuel emissions (3+5):** Fossil fuels (coal, oil, gas) are burned in power plants, vehicles and industry. Combustion is a chemical reaction that breaks carbon-carbon bonds, releasing the stored carbon as CO_2 gas into the atmosphere. **Agriculture (3+5):** Agricultural activities release carbon through multiple pathways — livestock (cattle, sheep) produce methane (CH_4) through enteric fermentation; rice paddies emit methane; soil disturbance from tillage releases stored soil carbon as CO_2; use of nitrogen-based fertilisers releases nitrous oxide (N_2O). **Fire (3+5):** When vegetation burns (wildfire or land clearance), the carbon stored in plant biomass is rapidly oxidised and released as CO_2 and other gases. **Volcanoes (3+5):** Volcanic eruptions release CO_2 and other gases from magma — this represents the outgassing of carbon stored deep in the Earth's mantle and crust. **Carbon in decomposition (3+5):** When organisms die, decomposer bacteria and fungi break down organic matter, releasing CO_2 through respiration.	**3 + 5**

(b) Enhanced greenhouse effect — transport, land-use change, technology. *(12 marks — 4 per sector)*

> *4 marks per sector. Award marks for a clearly explained causal mechanism — not just a statement that emissions occur. Accept any valid mechanism for each sector.*

Part	Acceptable Answer(s)	Marks
Transport ***4 marks***	Petrol and diesel vehicles combust fossil fuels, releasing CO_2 and other greenhouse gases (NOx, methane from incomplete combustion) directly into the atmosphere. Transport accounts for ~20% of Ireland's GHG emissions. Aviation and shipping also contribute significant emissions. The accumulation of these gases in the atmosphere intensifies the greenhouse effect, trapping more outgoing infrared radiation.	**4**
Land-use change ***4 marks***	When forests are cleared for agriculture, urban development or other uses, the carbon stored in trees and soil is released as CO_2 through burning or decomposition. Deforestation also removes trees that would otherwise absorb CO_2 through photosynthesis. Drainage of peatlands for agriculture releases centuries of stored carbon. These processes both add CO_2 to the atmosphere and reduce the capacity of the biosphere to absorb it.	**4**
Technology ***4 marks***	The production and use of digital technologies and electronic devices consumes large amounts of electricity, much of which is generated from fossil fuels — data centres, for example, require significant energy for computing and cooling. Manufacturing of devices (mining rare-earth minerals, smelting metals, production processes) involves energy-intensive processes that emit GHGs. Refrigeration and air conditioning technologies use hydrofluorocarbon (HFC) gases, which are potent greenhouse gases if they leak.	**4**

(c) Challenge of a just transition for Irish agriculture. *(14 marks)*

Award marks for: identifying and examining a specific, real challenge (up to 7 marks) + suggesting a coherent, practical approach to overcoming it (up to 7 marks). Responses must be Ireland-specific.

Part	Acceptable Answer(s)	Marks
14 marks	**Example challenge 1 — Farmer income and livelihood:** Irish agriculture is heavily dependent on livestock farming (beef and dairy), which are high-emission sectors. Transitioning to lower-emission farming practices (e.g. reduced herd numbers, rewetting land, organic conversion) threatens farmers' income and livelihoods, particularly for those in marginal rural areas with few alternative income sources. Many farms are small, family-owned operations with limited financial resilience. *Approach:* Government and EU support through agri-environment schemes such as ACRES (Agri-Climate Rural Environment Scheme) can compensate farmers financially for adopting environmentally beneficial practices. A Just Transition Commissioner for agriculture could oversee fair income supports, retraining, and diversification funding. Carbon farming payments could provide new revenue streams. **Example challenge 2 — Cultural identity and resistance to change:** Farming is deeply embedded in Irish cultural identity and rural communities. Calls to reduce cattle herds or change traditional practices can be perceived as attacks on a way of life, creating political and social resistance. Farmers may distrust government or urban environmentalists. *Approach:* Meaningful social dialogue between government, farm organisations (e.g. IFA, ICMSA), environmental groups, and rural communities. Farmer-led demonstration projects showing sustainable practices are economically viable. Emphasising farmer agency and the farmer's role as environmental steward rather than the problem.	**7 + 7**

Question 3 — Nature-Based Solutions, Facilitation and Policy (40 marks)

(a) Nature-based solutions — Figure 6. *(10 marks)*

(a)(i) Benefit of mangroves in a coastal ecosystem. *(4 marks)*

The answer must be drawn from Figure 6. Award 4 marks for correctly identifying the benefit stated in the infographic.

Part	Acceptable Answer(s)	Marks
4 marks	**Mangroves reduce 66% of wave height, easing erosion and flood risk.** According to Figure 6, mangroves act as a natural coastal buffer, absorbing wave energy and reducing wave height by up to 66%, which protects coastlines from erosion and reduces the risk of flooding in coastal communities.	**4**

(a)(ii) Explain, using an example, how any ecosystem can sequester CO_2. *(6 marks)*

2 marks for naming a specific ecosystem + 4 marks for explaining the sequestration process clearly. Accept any valid ecosystem.

Part	Acceptable Answer(s)	Marks
6 marks	Any ONE ecosystem with a clear sequestration explanation, e.g.: **Peatland / bog (2+4):** In a healthy peatland, sphagnum mosses and other plants absorb CO_2 from the atmosphere through photosynthesis. Because the waterlogged, anaerobic conditions slow decomposition, dead plant matter accumulates as peat over thousands of years, locking the carbon away in long-term storage. **Tropical rainforest (2+4):** Trees and other vegetation absorb CO_2 through photosynthesis and store the carbon in their biomass (trunks, branches, roots) and in the soil. Rainforests store vast quantities of carbon — the Amazon alone stores an estimated 150–200 billion tonnes. **Coastal wetland / seagrass (2+4):** Seagrass meadows and coastal wetlands absorb CO_2 through photosynthesis and bury carbon-rich organic matter in waterlogged sediments, where it decomposes very slowly. These “blue carbon” ecosystems sequester carbon at rates far higher per hectare than tropical forests. **Ocean (2+4):** Phytoplankton absorb CO_2 through photosynthesis; when they die, some carbon sinks to the ocean floor as “marine snow”, removing it from the active carbon cycle for long periods.	**2 + 4**

(b) Facilitation skills. *(14 marks)*

(b)(i) What is meant by facilitation of a discussion or meeting? *(4 marks)*

Part	Acceptable Answer(s)	Marks
4 marks	Facilitation is the process of guiding and supporting a group discussion or meeting to help participants communicate effectively, stay on topic, and work toward a shared outcome — without the facilitator imposing their own views or directing the conclusions. A facilitator creates an inclusive, safe environment where all voices can be heard, manages group dynamics, ensures equitable participation, and helps the group reach agreement or generate ideas collaboratively.	**4**

(b)(ii) Three factors to consider when planning to minimise barriers to participation. *(10 marks)*

> *The scenario involves 20 people from a broad range of socio-economic and cultural backgrounds. Award marks for factors that are clearly relevant to this diverse group.*

Part	Acceptable Answer(s)	Marks
3 factors ***~3 marks each***	Any THREE relevant factors, e.g.: **1. Timing and accessibility of the meeting:** Schedule at a time that accommodates people with work, childcare, or caring responsibilities (e.g. avoid school hours or early morning). Ensure the venue is physically accessible to people with mobility impairments. **2. Language and communication:** Consider whether translation or interpretation services are needed for participants whose first language is not English. Use plain language and avoid jargon. Provide written materials in advance. **3. Cultural sensitivity and inclusion:** Be aware of cultural norms around speaking in public, disagreement, and authority. Create a welcoming environment where no cultural background is privileged. Consider diverse representation in facilitation itself. **4. Economic barriers:** Consider whether childcare costs, transport costs, or lost wages prevent participation. Offering supports (e.g. childcare, travel expenses) can widen access. **5. Power dynamics:** Use anonymous input methods (e.g. written contributions, Mentimeter) so that people from lower socio-economic backgrounds or minority groups feel safe contributing without fear of judgment from more dominant voices.	**10**

(c) National policy decision in Ireland — cultural influences. *(16 marks)*

(c)(i): 2 marks for naming a valid Irish policy with environmental impact. ***(c)(ii):*** *14 marks for examining how cultural factors influenced it.*

Part	Acceptable Answer(s)	Marks
(c)(i) ***2 marks***	Any ONE valid national Irish policy decision with an environmental impact, e.g.: • Climate Action Plan 2023 • Plastic bag levy (2002) • Carbon tax • Deposit Return Scheme • National Biodiversity Action Plan • Nitrates Action Programme • ACRES agri-environment scheme • Just Transition for the Midlands • Peatland restoration policy (Bord na Móna transition)	**2**
(c)(ii) ***14 marks***	Cultural factors are values, beliefs, traditions, and social norms shared by a community that shape attitudes and behaviour — and therefore policy. **Example — Plastic bag levy (2002):** Irish cultural norms around convenience and consumption had normalised the widespread use of plastic bags. However, a growing cultural concern about environmental damage (partly driven by visible plastic pollution and international environmental awareness) created public openness to change. The levy worked in part because it tapped into a cultural value around not being seen to waste money. Media campaigns and the visible success of the levy reinforced a cultural shift — reusable bags became normalised. Farm and rural communities' connection to the land also created cultural receptiveness to environmental messages. **Example — Carbon tax:** Cultural factors include Ireland's historically strong farming identity, which created resistance to carbon pricing on agriculture. At the same time, a growing youth climate movement (Fridays for Future, Youth Climate Justice) shifted cultural expectations, making government inaction politically costly. Religious and community values around stewardship and care for the earth have also been invoked in support of climate action.	**14**

Question 4 — Climate Justice, Inequality and Community Adaptation (40 marks)

(a) Two ways the super-rich emit carbon other than through consumption — from the extract. *(6 marks — 3 per example)*

Candidates must draw from the Oxfam extract. The question specifies other than through consumption — do not award marks for yachts, private jets or lifestyle examples. Award 3 marks per correctly identified and explained non-consumption mechanism.

Part	Acceptable Answer(s)	Marks
2 examples ***3 marks each***	The extract states the super-rich emit carbon in three ways. The first (consumption) is excluded, leaving: **1. Through their investments and shareholdings in heavily polluting industries and their vested financial interest in the economic status quo.** By owning shares in fossil fuel companies, airlines, or other high-emission industries, wealthy individuals financially sustain and profit from carbon-intensive economic activity. **2. Through the undue influence they have over the media, the economy and politics.** Wealthy individuals use their power to shape policy, media narratives, and public opinion in ways that protect high-carbon economic systems and resist climate regulation. *Both must be drawn from the extract. Do not award marks for consumption-based emissions (yachts, private jets etc.).*	**3 + 3**

(b) Why people in the Global South are more vulnerable to climate change impacts. *(12 marks)*

Must refer to a specific example from the Global South. Award marks for: identifying specific vulnerability factors (up to 8 marks) + applying these to a named example (up to 4 marks).

Part	Acceptable Answer(s)	Marks
12 marks	**Vulnerability factors (up to 8 marks):** • **Lower adaptive capacity:** Less financial resources, infrastructure, and technology to prepare for, respond to, and recover from climate impacts. • **Economic dependence on climate-sensitive sectors:** Many Global South economies depend on subsistence agriculture, fishing, or tourism — all highly sensitive to climate disruption. • **Geographic exposure:** Many Global South nations are in tropical or coastal regions particularly exposed to heatwaves, flooding, cyclones, and sea-level rise. • **Inequality:** High inequality within countries means the most marginalised communities face the greatest risk with the fewest resources. • **Colonial legacies:** Historical exploitation has left many Global South nations with weakened institutions, debt burdens, and limited industrial infrastructure. **Named examples (up to 4 marks):** **Bangladesh:** Low-lying delta nation highly exposed to flooding and cyclones; millions depend on subsistence farming; limited resources to build coastal defences. **Small island states (Tuvalu, Kiribati):** Existential threat from sea-level rise; entire nations face submersion; contributed negligibly to global emissions. **Sub-Saharan Africa:** Extreme heat and drought threatening food and water security; economies dependent on rain-fed agriculture; underfunded health systems.	**8 + 4**

(c) Innovative community in Ireland adapting to climate change. *(10 marks)*

Must name a specific community. Award 2 marks for naming + 8 marks for explaining adaptation.

Part	Acceptable Answer(s)	Marks
10 marks	**Cloughjordan Ecovillage, Co. Tipperary (2+8):** Adapting to energy insecurity and fossil fuel dependence through a community-owned district heating system (wood-chip biomass), on-site solar and wind energy generation, and sustainably designed low-carbon housing. The community is also building food resilience through a community farm using agroecological methods. **Westport, Co. Mayo — coastal flooding adaptation (2+8):** Adapting to increased flood risk from rising sea levels and more intense storm events through hard engineering (flood walls, tide gates) and softer approaches including community flood preparedness plans and early warning systems. **LAWPRO catchment partnerships (2+8):** Communities working with the Land and Water Programme to adapt to deteriorating water quality and altered rainfall patterns through riparian buffer strips, cover cropping, and natural flood management measures.	**2 + 8**

(d) Economic inequality intersecting with ethnic inequality — reduced capacity to respond to climate change. *(12 marks)*

Part	Acceptable Answer(s)	Marks
12 marks	When economic poverty and ethnic or racial marginalisation overlap, people face compounded disadvantages that reduce their capacity to prepare for, respond to, and recover from climate change impacts. **Why capacity is reduced:** • Ethnic minority communities are often economically poorer due to historic discrimination — fewer financial resources to invest in climate adaptation. • Discrimination in housing means ethnic minorities are often concentrated in lower-quality, more exposed housing — floodplains, areas with poor air quality. • Political marginalisation means ethnic minority communities have less influence over the climate policies that affect them. • Language barriers, lack of trust in authorities, and social exclusion can reduce access to climate information, early warning systems, and disaster relief. **Examples:** • Hurricane Katrina (2005): Black and Latino communities disproportionately affected due to inferior housing, lack of resources to evacuate, slower government response. • **Cancer Alley, Louisiana:** predominantly Black communities near petrochemical plants suffer higher rates of pollution-related illness. • **Ireland — Traveller communities:** face multiple intersecting disadvantages — economic poverty, ethnic discrimination, inadequate halting sites in flood-risk areas, and exclusion from mainstream policy processes.	**12**

Question 5 — International Commitments, Climate Debt and Policy (40 marks)

(a) Three bodies or groups that influenced international COP commitments — from the timeline. *(6 marks — 2 per body)*

Candidates must draw from the timeline. Award 2 marks per correctly identified body or group.

Part	Acceptable Answer(s)	Marks
3 bodies ***2 marks each***	Any THREE from the timeline, e.g.: • **NGOs and grassroots organisations** (1992 — Debt Treaty outside Rio Summit) • **Small island states / representatives** (2010 — loss and damage at COP16) • **Global South organisations / civil society** (2009 — 254+ orgs signed Copenhagen climate debt declaration) • **IPCC** (2007 AR4; 2014 AR5 warned of severe/irreversible impacts) • **People's climate justice summits** (2000 onwards) • **Fossil fuel lobbyists** (2022, 2023 — 636 and 2,456 respectively) • **Wealthy countries / governments** (2023 — pledged $700m to Loss and Damage Fund)	**2 + 2 + 2**

(b) Define ecological debt and climate debt. *(8 marks — 4 each)*

Part	Acceptable Answer(s)	Marks
Ecological debt ***4 marks***	The debt that industrialised nations of the Global North owe to the Global South as a result of centuries of resource extraction, environmental exploitation, and pollution — including the overuse of the atmospheric commons (by emitting disproportionate greenhouse gases) — that has damaged ecosystems and undermined the development prospects of poorer nations.	**4**
Climate debt ***4 marks***	The specific debt that wealthy, high-emitting nations owe to low-emitting, climate-vulnerable nations as a result of their disproportionate contribution to cumulative greenhouse gas emissions, which drive climate change impacts felt most severely by those least responsible. Underpins calls for: loss and damage finance, adaptation funding, and technology transfer from Global North to Global South.	**4**

(c) One example of colonialism contributing to climate injustice. *(8 marks)*

Part	Acceptable Answer(s)	Marks
8 marks	**Example 1 — Sub-Saharan Africa / Congo Basin:** European colonialism extracted vast natural resources (timber, rubber, minerals, agricultural products) over centuries, leaving economies structurally dependent on commodity exports. Today, African nations — which contributed less than 4% of cumulative global CO_2 emissions — face some of the most severe climate impacts (drought, desertification, flooding, food insecurity). **Example 2 — Pacific Island Nations:** Pacific islands were colonised by European powers, their resources extracted, their peoples subjugated. Nations like Tuvalu and Kiribati face total submersion from sea-level rise caused overwhelmingly by emissions from wealthy former colonial powers — a profound climate injustice. **Example 3 — Indigenous peoples and extractivism:** Colonial land seizures dispossessed indigenous peoples of territories they had managed sustainably for generations. This dispossession continues through extractive industries on indigenous lands, releasing carbon while destroying biodiversity.	**8**

(d) Why wealthy countries should pay into climate adaptation and mitigation funds for the Global South. *(8 marks)*

Part	Acceptable Answer(s)	Marks
8 marks	Any well-developed combination of: • **Historical responsibility:** Wealthy industrialised nations are responsible for the vast majority of cumulative GHG emissions. • **Climate debt and ecological debt:** Wealthy nations have used more than their fair share of the atmospheric commons. • **Capacity:** Global South nations lack the financial resources to adapt or mitigate on their own. • **Effectiveness of global action:** Climate change is a global problem — funding mitigation in the Global South is in everyone's interest. • **Justice and rights:** Access to a stable climate is increasingly recognised as a human right. • **UNFCCC principle of common but differentiated responsibilities:** International climate law recognises that all nations share responsibility, but its extent differs based on historical emissions and current capacity.	**8**

(e) How Irish policy has been changed by international COP commitments. *(10 marks)*

Part	Acceptable Answer(s)	Marks
10 marks	**Example 1 — Paris Agreement (COP21, 2015) → Climate Action and Low Carbon Development (Amendment) Act 2021:** Ireland's legally binding commitment under the Paris Agreement directly informed the 2021 Climate Act, which set Ireland's legally binding target of net-zero GHG emissions by 2050 and a 51% reduction by 2030. It also introduced carbon budgets — the first time sectoral emissions limits were placed in law in Ireland. **Example 2 — COP26 (Glasgow, 2021) → Climate Action Plan 2023:** At COP26 Ireland committed to more ambitious NDCs. The subsequent CAP 2023 set out detailed sectoral roadmaps — including 500,000 EVs by 2030, 7 GW of offshore wind, and agricultural methane reductions. **Example 3 — COP27 (2022) Loss and Damage Fund → Irish Government support:** Ireland was among the first countries to explicitly pledge contributions to the Loss and Damage Fund, reflecting the international commitment in its climate finance policy.	**2 + 2 + 6**

Question 6 — Ecosystems Investigation and Water Efficiency (40 marks)

(a) Ecosystem investigation — Figure 7 (woodland ecosystem). *(16 marks)*

(a)(i) One environmental factor that could be studied in the woodland ecosystem. *(4 marks)*

Part	Acceptable Answer(s)	Marks
4 marks	Any ONE valid environmental factor measurable in a woodland, e.g.: • Light intensity / light levels (light meter at different depths) • Soil pH (soil pH meter or indicator solution) • Soil moisture content • Temperature (air or soil) • Humidity • Species diversity / abundance • Leaf litter depth / decomposition rate • Canopy cover (% sky obscured)	**4**

(a)(ii) One suitable method of gathering primary data in this ecosystem. *(4 marks)*

Part	Acceptable Answer(s)	Marks
4 marks	Any ONE valid primary data method suited to woodland, with description: • **Quadrat sampling:** Place a quadrat (e.g. 0.5m × 0.5m) randomly within the woodland. Record all plant species and percentage cover. Repeat for representative sample. • **Transect:** Lay a measuring tape across the ecosystem (e.g. edge to interior). Record species at regular intervals to investigate distribution changes. • **Pitfall trap:** Bury a container flush with the soil to capture ground-dwelling invertebrates; identify and count. • **Light meter readings:** Measure lux levels at different points within the woodland at the same time of day. • **Soil sampling:** Collect soil samples; measure pH, moisture, or organic content.	**2 + 2**

(a)(iii) How to ensure accuracy when gathering data in an ecosystem. *(8 marks)*

Part	Acceptable Answer(s)	Marks
8 marks	Award marks for a combination of valid accuracy measures: • **Repeat measurements / multiple samples:** Take multiple readings and calculate an average — reduces impact of anomalies. • **Random sampling:** Use random number tables to select locations — prevents unconscious bias. • **Calibrate instruments:** Check and calibrate before use. • **Standardise method:** Same equipment, same technique, same time of day. • **Record data systematically:** Use clear data recording sheets. • **Appropriate sample size:** Enough samples to be statistically meaningful. • **Minimise disturbance:** Disturbing the ecosystem as little as possible.	**8**

(b) Candidate's own ecosystem investigation. *(12 marks)*

Part	Acceptable Answer(s)	Marks
(b)(i) ***2 marks***	Any valid, named local ecosystem studied, e.g.: bog, river, beach, woodland, hedgerow, school grounds, park, dune system, estuary.	**2**
(b)(ii) ***2 marks***	Any valid, measurable environmental factor appropriate to the named ecosystem, e.g.: light intensity, soil pH, water pH, temperature, species diversity, dissolved oxygen, salinity.	**2**
(b)(iii) ***8 marks***	Award 4 marks for a clear conclusion + 4 marks for explanation of how data supports it. **Example (woodland):** *Conclusion:* Light intensity was significantly lower in the interior of the woodland than at its edges. *Explanation:* Quadrat data showed shade-tolerant species (ivy, ferns) dominant in the interior where light meter readings averaged below 500 lux, while sun-loving species were concentrated near the edge where readings exceeded 5,000 lux. This pattern is consistent with the known effect of canopy cover on light availability.	**4 + 4**

(c) How water efficiency can contribute to decarbonising an economy. *(12 marks)*

Part	Acceptable Answer(s)	Marks
12 marks	**Water–energy–carbon nexus:** Water and energy are deeply interlinked. Treating, pumping, and heating water all require significant energy — predominantly from fossil fuels in many economies. Reducing water consumption or improving water efficiency therefore reduces energy demand and associated GHG emissions. **Ways water efficiency contributes to decarbonisation:** • Reducing water demand lowers the energy needed for treatment and distribution. • Hot water efficiency (low-flow showers, efficient boilers) reduces heating energy. • Efficient irrigation reduces both extraction (pumping) and embedded energy. • Reducing leakage from pipe networks reduces wasted treatment energy. **Named examples:** • **Irish Water / Uisce Éireann:** Network has historically had ~40% leakage. Reduction efforts cut wasted treatment energy. • **Agriculture — precision irrigation:** Drip irrigation and soil moisture sensors reduce pumping energy vs flood irrigation. • **Singapore's NEWater:** Water recycling reduces dependence on energy-intensive desalination. • **Industrial water efficiency:** Closed-loop systems in food processing, data centres reduce both consumption and treatment energy.	**6 + 6**

Section C — 80 marks

Answer **one** question in this section. Each question carries 80 marks.

Section C Assessment Criteria

Criterion	Descriptor	Max	Band Marks
Knowledge & Understanding	Accurate, relevant factual content; understanding of key CASD concepts; appropriate use of subject terminology.	**32**	H: 28–32 M: 18–27 L: 0–17
Analysis & Evaluation	Critical thinking; multiple perspectives including justice frameworks; quality of argument; evidence; engagement with root causes.	**28**	H: 24–28 M: 15–23 L: 0–14
Use of Examples	Named, specific, relevant examples; both local (Irish) and global at higher bands; CASD case studies particularly valued.	**12**	H: 10–12 M: 6–9 L: 0–5
Communication	Clarity of expression; logical structure and flow; appropriate academic register; coherent essay format.	**8**	H: 7–8 M: 4–6 L: 0–3

Question 7 — Sustainable Development, SDGs and Economic Approaches (80 marks)

> *All four bullet points must be addressed for the highest marks. Assess holistically using the four criteria above.*

Required Element	Expected Content — High-Band Response
Origins of the concept of sustainability	The concept emerged from growing awareness of environmental limits in the 20th century. **Key moments:** Rachel Carson's *Silent Spring* (1962); the *Limits to Growth* report (Club of Rome, 1972); UNEP after Stockholm Conference (1972); the Brundtland Report (*Our Common Future*, 1987) defined sustainable development as meeting present needs without compromising future generations'. This established the three pillars: environmental, economic, social. The Rio Earth Summit (1992) produced Agenda 21 and the UNFCCC. The MDGs (2000) led to the SDGs (2015) — 17 goals for 2030.
Critiques of development and sustainable development	**Critiques of development:** • Traditional GDP-focused development equates growth with progress, ignoring inequality, environmental damage, and wellbeing. • **Dependency theory / post-development:** development has perpetuated Global South dependence on Global North economies. • **Degrowth:** questions whether growth is compatible with ecological limits. **Critiques of sustainable development:** • **"Weak sustainability"** — treats natural capital as substitutable. • SDGs criticised for being broad, lacking enforcement, framed within growth, failing to address power imbalances, not tackling root causes. • **Greenwashing risk** — SDG language without substantive change. • **Climate justice critique:** SDGs do not adequately address Global South burden.
Planetary boundaries and climate justice	**Planetary boundaries:** Rockström et al. (Stockholm Resilience Centre) identifies nine Earth system processes with safe operating limits. Several boundaries (climate change, biodiversity loss, land system change, novel entities) have already been exceeded. SDGs interact with planetary boundaries — social development goals must be achieved within ecological limits, not by breaching them. **Climate justice:** Even if global sustainability is achieved, costs and benefits must be distributed equitably. Current SDG implementation risks greenwashing or imposing the burden on the Global South. A just transition requires recognition of historical responsibility, equitable distribution, meaningful participation, and protection of the most vulnerable.

Required Element	Expected Content — High-Band Response
Capitalism and one other economic approach	**Capitalism and sustainability:** Capitalism has driven unprecedented growth but also the resource extraction and emissions threatening sustainability. The profit motive incentivises externalisation of environmental costs. Short-term shareholder returns conflict with long-term ecological sustainability. **Alternative economic approaches:** • **Doughnut Economics (Raworth):** Economic activity within a "safe and just space" between social foundations and planetary boundaries. Rejects GDP growth as primary goal. • **Degrowth:** Planned reduction in economic throughput in wealthy nations. • **Circular Economy:** Eliminate waste — keep materials in use through repair, reuse, remanufacturing, recycling. • **Steady-state economy:** Economic activity within ecological limits without growth. *High-scoring responses compare capitalism and the chosen alternative on sustainability, justice, and real-world applicability.*

Question 8 — Media, Values and Climate Justice Reporting (80 marks)

> *All four bullet points must be addressed for the highest marks. Assess holistically using the four criteria above.*

Required Element	Expected Content — High-Band Response
How an issue is communicated differently across media	Candidates choose a climate justice issue (e.g. Loss and Damage Fund, fossil fuel disinformation, just transition, climate refugees, Cancer Alley) and show how it is framed differently by different media. **Key dimensions of difference:** • **Framing:** Which aspects emphasised? Who is victim, hero, villain? • **Language:** Emotionally charged vs. neutral; "climate change" vs. "climate emergency". • **Sources:** Scientists, NGOs, affected communities, ministers, industry — whose voices? • **Format:** Broadcast (seconds), print (depth), social (emotion), documentary (investigation). **Example — fossil fuel disinformation:** Market-oriented papers might frame fossil fuel companies as economic contributors under attack; progressive outlets frame around deliberate deception; activists use emotional imagery and personal testimony for urgency.
Imbalances between media creators and consumers	**Power:** A small number of conglomerates (News Corp, Comcast, Disney) own disproportionate share of global media. Owners' worldviews and financial interests shape editorial decisions. Fossil fuel advertising creates financial dependencies. **Wealth:** Investigative journalism is expensive. Wealthier organisations afford sustained coverage; community media cannot. Wealthier countries receive higher-quality climate journalism. **Capacity for action:** Media consumers — particularly in the Global South — are most affected by climate change but have least access to platforms. Social media has partially democratised voice, but algorithms favour engagement (outrage) over depth. **Digital divide:** Communities without reliable internet are excluded from online climate discourse.

Required Element	Expected Content — High-Band Response
Effectiveness of controls on media	**Formal controls:** • Broadcasting regulators (Coimisiún na Meán in Ireland, Ofcom in UK) require balance and accuracy. However, "balance" in climate has historically led to false equivalence — equal airtime to deniers and scientists. • Press councils (Press Council of Ireland) handle complaints but are voluntary. • Advertising standards regulate misleading advertising including greenwashing. **Informal controls:** • Social media platforms have introduced climate information labels and removed some disinformation, but enforcement is inconsistent and monetisation rewards sensationalism. • Fact-checking organisations (FactCheck.ie, Full Fact) provide accountability but lack reach. **Conclusion:** Controls are generally insufficient — particularly online — to prevent climate misinformation and ensure equitable representation.
Justified conclusion	High-scoring responses reach a nuanced, justified conclusion on whether media worldviews and values constitute "a problem." **Likely YES argument:** The concentration of media ownership, commercial incentives, historical platforming of climate denial, and marginalisation of Global South voices collectively mean media has systematically distorted public understanding of climate justice. Contributed to inadequate political action. Problem is structural. **Possible PARTIAL / NUANCED argument:** While dominant media has these problems, alternative media, investigative journalism, and social media create spaces for more accurate and justice-centred coverage. Picture is not entirely negative. Solution is media literacy, stronger regulation, support for independent journalism. *Award high marks for clearly argued conclusions that refer back to examples and engage with complexity.*

This marking scheme is indicative. Examiners should use professional judgement when awarding marks and credit all reasonable responses not listed here. Prepared by SimpleStudy for study purposes; not an official State Examinations Commission document.