Name: _____ **Date:** _____

Answer Key: Will Our Systems Survive? Advanced Sustainability Quiz for College Scholars

Scholars synthesize complex socio-ecological indicators and life cycle assessments to evaluate the viability of global resource management frameworks.

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1. When conducting a Life Cycle Assessment (LCA) for a nascent bio-plastic technology, which 'system boundary' approach is most rigorous for evaluating long-term carbon sequestration versus methane release in anaerobic environments?

Answer: C) Cradle-to-Cradle

Cradle-to-Cradle (C2C) analysis is the most comprehensive as it evaluates the material's potential for perpetual cycles, crucial for assessing the trade-offs between sequestration and decomposition gases.

2. In the context of the 'Strong Sustainability' model, the _____ is viewed as a subset of the social system, which is itself a subset of the biophysical environment, implying that natural capital cannot be substituted by human-made capital.

Answer: B) Economic system

The Economic system is the correct filler; Strong Sustainability posits that the economy is nested within society and the environment, rejecting the 'Weak Sustainability' premise of capital substitutability.

3. The 'Jevons Paradox' suggests that increases in resource efficiency will necessarily lead to a decrease in the total rate of consumption of that resource due to market saturation.

Answer: B) False

False. The Jevons Paradox actually posits the opposite: that technological progress increasing resource efficiency often increases (rather than decreases) the total rate of consumption of that resource.

4. Which socio-economic indicator, developed as an alternative to GDP, incorporates 26 different variables to measure the net welfare of a nation by accounting for income inequality and the costs of environmental degradation?

Answer: B) Genuine Progress Indicator (GPI)

The GPI is the most robust multidimensional metric mentioned that specifically subtracts 'negatives' like pollution and crime from the 'positives' of economic production.

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5. The concept of _____ designates a safe operating space for humanity regarding nine Earth system processes, such as phosphorus and nitrogen cycles, where crossing certain thresholds may trigger non-linear environmental change.

Answer: A) Planetary Boundaries

The Planetary Boundaries framework, pioneered by the Stockholm Resilience Centre, defines the environmental limits within which humanity can safely operate.

6. Assess the 'rebound effect' in the context of urban lighting. If a city replaces all streetlights with high-efficiency LEDs but then uses the saved energy costs to install twice as many lights, what has occurred?

Answer: C) Direct Rebound Effect

A direct rebound effect occurs when the efficiency gain in a service leads to increased consumption of that specific service, potentially offsetting the initial environmental benefits.

7. Biomimicry in industrial design focuses exclusively on using organic materials to create products, rather than emulating biological functional patterns.

Answer: B) False

False. Biomimicry is the design and production of materials, structures, and systems modeled on biological entities and processes, not just using organic ingredients.

8. When a firm externalizes its environmental costs to a third party or the future without compensation, it creates a _____, which leads to market failure and an over-allocation of resources to that activity.

Answer: B) Negative Externality

A negative externality is a cost that is suffered by a third party as a result of an economic transaction; it is a central challenge in environmental economics.

9. Analyze the 'Tragedy of the Commons' through a modern lense. Which institutional design, proposed by Elinor Ostrom, most effectively prevents the degradation of common-pool resources without total privatization?

Answer: C) Polycentric governance and local self-organization

Nobel laureate Elinor Ostrom demonstrated that community-led, polycentric governance structures are often more effective at managing shared resources than state or private monopolies.

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10. In Industrial Ecology, the 'Extended Producer Responsibility' (EPR) policy shifted the responsibility for post-consumer waste from municipalities back to the original manufacturers.

Answer: A) True

True. EPR is a strategy to decrease the total environmental impact of a product by making the manufacturer responsible for the entire life cycle of the product, especially take-back and disposal.