Economic Principles in Nature and Ecology

Microeconomics · Answer Key · 15 Questions

1. In optimal foraging theory, what does the 'marginal value theorem' predict regarding a predator's decision to leave a patch of food?

A) The predator leaves when the marginal rate of intake drops to the average rate of the habitat

B) The predator leaves once the total energy expenditure exceeds the total caloric gain

C) The predator leaves after a fixed amount of time regardless of resource density

D) The predator stays until the patch is completely depleted of all energy sources

2. Which economic concept explains why individual fishers deplete common-pool migratory stocks despite long-term sustainability interests?

A) Gresham's Law

B) The Tragedy of the Commons

C) The Law of Diminishing Returns

D) Comparative Advantage

3. In biological 'tit-for-tat' strategies observed in vampire bats sharing blood meals, which economic game theory concept is being demonstrated?

A) Zero-sum equilibrium

B) Reciprocal altruism

C) Sunk cost fallacy

D) Monopolistic competition

4. What is the 'opportunity cost' for a male bowerbird focusing time and energy on decorating his bower rather than foraging?

A) The metabolic rate of the bird

B) The potential mating opportunities lost elsewhere

C) The quantity of blue items collected

D) The risk of predation during construction

5. How do economists define the 'externalities' produced by large-scale honeybee pollination services for commercial agricultural sectors?

A) Negative production externalities

B) Positive production externalities

C) Deadweight loss

D) Marginal social cost

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6. The concept of 'producer surplus' in a natural ecosystem is best illustrated by which biological phenomenon?

A) The difference between the energy cost to create a seed and the value of its dispersal
B) The total amount of carbon sequestered by a forest
C) The maximum carrying capacity of a territory
D) The evolution of camouflage in prey species

7. Which phenomenon in behavioral ecology mirrors the economic 'Sunk Cost Fallacy'?

A) A bird continuing to incubate a clutch of eggs that have failed to hatch
B) A predator choosing to hunt larger prey over smaller, easier targets
C) An animal caching food in multiple locations to reduce risk
D) A species migrating to a new region due to climate change

8. In the context of environmental economics, what does a 'Pigouvian tax' aim to correct when applied to industrial nitrogen runoff?

A) The supply curve shift
B) Market failure due to negative externalities
C) Information asymmetry
D) Natural monopoly pricing

9. What represents the 'marginal cost' for a honeybee colony when deciding whether to recruit more foragers for a specific flower patch?

A) The energy spent on 'waggle dances' to communicate location
B) The total honey stores within the hive
C) The number of flowers in the patch
D) The lifespan of the worker bees

10. Which economic principle dictates that a species will utilize the most efficient resource first, even if other resources are available?

A) The Law of Equimarginal Returns
B) The Law of Comparative Advantage
C) The Principle of Substitution
D) Gossen's First Law

11. What occurs when the 'marginal social cost' of biodiversity loss exceeds the 'marginal social benefit' of industrial development?

A) Pareto efficiency
B) Deadweight loss to society
C) Market equilibrium
D) Increased consumer surplus

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12. How is 'elasticity of demand' manifested in the behavior of hummingbirds searching for nectar?

A) Sensitivity of foraging time to changes in nectar sugar concentration
B) The total distance traveled between flowers
C) The number of species visited by the hummingbird
D) The rate at which the bird flaps its wings

13. In evolutionary game theory, what is an 'Evolutionarily Stable Strategy' (ESS) equivalent to in classical microeconomics?

A) A Nash Equilibrium
B) A perfectly competitive market outcome
C) A monopolistic barrier to entry
D) A price ceiling

14. What does the 'Coase Theorem' suggest regarding the management of transboundary river pollution?

A) Private bargaining can achieve efficiency if transaction costs are low
B) Government intervention is the only way to reduce pollution
C) The market always leads to the optimal level of water purity
D) Polluters should never be held liable for ecological damages

15. Which economic term describes the situation where a predator consumes so much of a prey population that the predator's own future growth is hindered?

A) Negative feedback loop
B) Over-extraction of renewable resources
C) Perfect price discrimination
D) Economies of scale

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