Environmental Science (ENVS) Practice Test (Sample)

Study Guide

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Questions

1. What is the cleanest burning fossil fuel that produces the least pollutants?

- **A. a. Nuclear energy, produced from rocks and minerals within the Earth.**
- **B. b. Coal, usually found in deposits deep within the Earth.**
- **C. c. Kerosene, found in deposits associated with oil wells.**
- **D. d. Natural gas, usually found in deposits associated with oil.**

2. Better sanitation and nutrition generally resulted from the?

- **A. Environmental Revolution**
- **B. Medical Revolution**
- **C. Green Revolution**
- **D. Industrial Revolution**

3. What is the primary issue with rabbits introduced to Australia?

- **A. They evolved into three new species**
- **B. They evolved with marsupials**
- **C. They were eliminated by a lethal virus**
- **D. They exemplify high biotic potential of some introduced species**

4. From where are some successful drugs like taxol and Tamiflu derived?

- **A. Genetically modified cultivars**
- **B. Intrinsic value of wild species**
- **C. Mutations in wheat cultivars**
- **D. Wild plants**

5. One concern regarding transgenic crops that produce pesticides is that this trait may:

- **A. Be so effective, that all of the crop pests are eliminated.**
- **B. Kill other insects that are not pests.**
- **C. Be transferred to other crops, such as soybeans or cotton.**
- **D. Not kill pests that attack other crops, such as soybeans or cotton.**

6. What ecological characteristic is primarily associated with ecological succession?

A. Slow changes over time in community structure

B. Immediate shifts in species composition

C. Stable population sizes

D. Random changes in biodiversity

7. Biotechnology can promote sustainability by:

A. Allowing more land to be brought into agricultural production.

B. Reducing the need for herbicides.

C. Reducing the use of conventional pesticides.

D. Permitting deep plowing without risk of erosion.

8. Which trend has occurred in the population dynamics of urban areas over the past 50 years in the United States?

A. City centers and rural regions have increased while suburbs have declined

B. City centers have increased while suburbs and rural regions have declined

C. Suburbs and rural regions have increased while city centers have declined

D. Suburbs have increased while rural regions and city centers have declined

9. Which of the following best illustrates sound science?

A. Lobbying government officials to increase drilling for offshore oil

B. Selecting a source of energy based upon profitability and yield of tax dollars

C. Measuring wind-velocities to determine the cost-effectiveness of windmills in a region

D. Asking voters to determine if windmills should be placed in their community

10. In a greenhouse, where is the best position to place a plant for optimal sunlight exposure?

A. Within its limits of tolerance.

B. At the photosynthetic limit.

C. Within its optimal range.

D. At its zones of stress.

Answers

1. D
2. B
3. D
4. D
5. B
6. A
7. C
8. D
9. C
10. C

Explanations

1. What is the cleanest burning fossil fuel that produces the least pollutants?

A. a. Nuclear energy, produced from rocks and minerals within the Earth.

B. b. Coal, usually found in deposits deep within the Earth.

C. c. Kerosene, found in deposits associated with oil wells.

D. d. Natural gas, usually found in deposits associated with oil.

Natural gas is considered the cleanest burning fossil fuel primarily due to its chemical composition and the efficiency with which it burns. It consists mainly of methane (CH4), which, when combusted, produces significantly lower emissions of carbon dioxide, sulfur dioxide, and nitrogen oxides compared to other fossil fuels like coal and oil. When burning natural gas, the primary products are carbon dioxide and water vapor, resulting in almost no particulate matter or heavy pollutants. This reduction in harmful emissions contributes to better air quality and mitigates the impacts of climate change when compared to other fossil fuels. The other fuels listed do not share this same level of cleanliness. For instance, coal produces high levels of carbon dioxide and various pollutants such as sulfur and nitrogen oxides, along with particulates that contribute to respiratory problems and environmental damage. Kerosene, while cleaner than coal, still releases significant amounts of carbon emissions and other pollutants when burned. In contrast, nuclear energy, while it has a low emission profile after its lifecycle is considered, is not classified as a fossil fuel. Therefore, based on the low pollutant output and its relatively higher efficiency when burned, natural gas stands out as the cleanest fossil fuel option available.

2. Better sanitation and nutrition generally resulted from the?

A. Environmental Revolution

B. Medical Revolution

C. Green Revolution

D. Industrial Revolution

The correct answer is based on the substantial improvements in public health that emerged during the medical revolution. This period saw significant advancements in medical knowledge and practices, including the development of vaccines, improvements in surgical techniques, and better understanding of hygiene. These medical advancements directly contributed to better sanitation practices and nutrition. As awareness of the importance of hygiene rose, public health initiatives led to cleaner living conditions, which helped to reduce the spread of infectious diseases. Additionally, the medical revolution facilitated improvements in nutrition through better understanding of dietary needs and the increased availability of food due to agricultural improvements, which were often associated with other revolutions, such as the Green Revolution but primarily due to the medical innovations in health care and sanitation practices. This context clarifies the strong relationship between the medical revolution and advancements in sanitation and nutrition, setting it apart from the other options, which focus on different aspects of societal change but do not directly link to improvements in public health in the same impactful way.

3. What is the primary issue with rabbits introduced to Australia?

A. They evolved into three new species

B. They evolved with marsupials

C. They were eliminated by a lethal virus

D. They exemplify high biotic potential of some introduced species

The primary issue with rabbits introduced to Australia is that they exemplify the high biotic potential of some introduced species. When rabbits were brought to Australia in the 1800s, they were able to reproduce rapidly due to their high reproductive rates. A single female rabbit can have multiple litters each year, and each litter can contain numerous offspring. This high biotic potential allowed their population to explode in a short period, leading to significant ecological consequences. The introduction of rabbits disrupted local ecosystems as they outcompeted native species for food and habitat. Their grazing habits also contributed to land degradation, soil erosion, and changes in plant communities, which further harmed native wildlife and biodiversity. This situation highlights how certain species can thrive in new environments when they lack natural predators and how their rapid growth can have detrimental effects on existing ecosystems.

4. From where are some successful drugs like taxol and Tamiflu derived?

A. Genetically modified cultivars

B. Intrinsic value of wild species

C. Mutations in wheat cultivars

D. Wild plants

Taxol and Tamiflu are both derived from wild plants, emphasizing the significant role that biodiversity plays in drug development. Taxol, for instance, is a compound that was originally isolated from the bark of the Pacific yew tree, demonstrating how natural sources can yield important medicinal compounds. Similarly, Tamiflu, used to treat influenza, is derived from a substance found in certain wild species. This highlights the intrinsic value of wild plants in pharmaceuticals, underscoring the importance of conserving natural habitats to maintain the biodiversity that can lead to future medical discoveries. The other options pertain to agricultural or biotechnological contexts which may not directly relate to the sources of these specific drugs. Genetically modified cultivars and mutations in wheat cultivars focus on cultivated species and agricultural practices rather than the use of wild plants as sources for pharmaceuticals. The intrinsic value of wild species does reflect the importance of biodiversity but does not specifically indicate the source of these drugs, making the direct reference to wild plants the most precise answer.

5. One concern regarding transgenic crops that produce pesticides is that this trait may:

A. Be so effective, that all of the crop pests are eliminated.

B. Kill other insects that are not pests.

C. Be transferred to other crops, such as soybeans or cotton.

D. Not kill pests that attack other crops, such as soybeans or cotton.

The concern regarding transgenic crops that produce pesticides primarily revolves around their potential impact on non-target organisms, which includes beneficial insects such as pollinators and predators of pest species. When these genetically modified crops release pesticides into the environment, the chemical compounds may unintentionally affect insects that are not harmful to agriculture. This can lead to declines in beneficial insect populations, disrupting local ecosystems and potentially resulting in increased pest populations due to the loss of natural predators. Choosing this answer underscores the broader ecological implications of using genetically modified crops, where the benefits of pest resistance might come at the cost of harming other parts of the ecosystem. The focus on non-pest insects is crucial because it highlights the complexity of interactions in food webs and ecosystem dynamics, emphasizing the need for careful assessment before widespread implementation of such agricultural technologies.

6. What ecological characteristic is primarily associated with ecological succession?

A. Slow changes over time in community structure

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Ecological succession is a gradual process where ecological communities change over time, characterized by a series of progressive changes in species composition and community structure. This process can occur in various environments following disturbances, such as after a fire, flooding, or human impact, where initial communities are eventually replaced by more complex ones. The correct answer highlights that succession entails slow, predictable changes in community structure over time. Early stages of succession may involve pioneer species that colonize barren or disturbed land, leading to the establishment of intermediate communities and ultimately resulting in a stable, mature ecosystem—often referred to as a climax community. In contrast, immediate shifts in species composition typically occur due to rapid disturbances rather than the gradual nature of succession. Stability in population sizes can be a feature of mature ecosystems, but rather than being indicative of succession itself, this reflects the end results of such processes. Random changes in biodiversity do not align with the systematic, predictable patterns that define ecological succession, which emphasize gradual transitions and stages influenced by previous communities.

7. Biotechnology can promote sustainability by:

A. Allowing more land to be brought into agricultural production.

B. Reducing the need for herbicides.

C. Reducing the use of conventional pesticides.

D. Permitting deep plowing without risk of erosion.

Biotechnology promotes sustainability primarily by reducing the use of conventional pesticides. Through genetic engineering and other biotechnological advances, crops can be modified to express traits that enhance their resistance to pests and diseases. This means that farmers can rely less on chemical pesticides to manage these threats, leading to several benefits. By decreasing the reliance on conventional pesticides, biotechnology can limit the potential negative impacts on non-target organisms, such as beneficial insects and microbial communities in the soil. This contributes to a more balanced ecosystem. Additionally, reduced pesticide use can help lower production costs for farmers and minimize chemical runoff into water bodies, which can lead to environmental pollution and health risks for local communities. The advantages of biotechnology in promoting agricultural sustainability thus center around improving crop resilience and health, which lessens reliance on synthetic chemicals while maintaining or boosting agricultural productivity.

8. Which trend has occurred in the population dynamics of urban areas over the past 50 years in the United States?

A. City centers and rural regions have increased while suburbs have declined

B. City centers have increased while suburbs and rural regions have declined

C. Suburbs and rural regions have increased while city centers have declined

D. Suburbs have increased while rural regions and city centers have declined

The trend in the population dynamics of urban areas over the past 50 years in the United States indeed shows that suburbs have grown significantly while both rural regions and traditional city centers have experienced decline. This phenomenon can be attributed to several factors, including the desire for more space, better quality of life, and affordable housing options typically found in suburban areas compared to densely populated city centers. As transportation infrastructure improved, many people began to commute from suburban areas to urban jobs, leading to a preference for suburban living. In contrast, city centers have faced challenges such as increases in living costs, overcrowding, and sometimes an increase in urban decay in certain areas. Rural regions have also been declining as economic opportunities have shifted toward urban and suburban settings, leading to population losses as people move in search of jobs and better services. This overall dynamic reflects broader trends in urbanization and suburbanization that have been observed across many regions in the United States during this timeframe.

9. Which of the following best illustrates sound science?

A. Lobbying government officials to increase drilling for offshore oil

B. Selecting a source of energy based upon profitability and yield of tax dollars

C. Measuring wind-velocities to determine the cost-effectiveness of windmills in a region

D. Asking voters to determine if windmills should be placed in their community

The choice that best illustrates sound science is the measurement of wind velocities to determine the cost-effectiveness of windmills in a region. This process involves empirical data collection and analysis, which are fundamental aspects of scientific inquiry. By measuring wind velocities, researchers can assess the potential energy output of windmills based on actual environmental conditions, enabling informed decision-making about the feasibility and efficiency of wind energy in that area. Sound science is characterized by systematic observation, experimentation, and data analysis, and it seeks to provide objective findings that contribute to understanding environmental issues. This choice exemplifies that approach by relying on quantifiable data to draw conclusions about energy options, which can further guide policy and investments. In contrast, the other options lack the scientific rigor that defines sound science. Lobbying for increased drilling focuses more on advocacy and political influence rather than empirical evidence. Selecting energy sources based on profitability and tax yield prioritizes economic factors over scientific assessment. Lastly, while asking voters about windmills incorporates public opinion, it does not directly involve scientific data or analysis that would lead to sound environmental conclusions.

10. In a greenhouse, where is the best position to place a plant for optimal sunlight exposure?

A. Within its limits of tolerance.

B. At the photosynthetic limit.

C. Within its optimal range.

D. At its zones of stress.

Placing a plant within its optimal range is crucial for its growth and development because this zone is where the conditions—such as light intensity, temperature, and moisture—are most favorable for photosynthesis and overall health. In this range, the plant can efficiently convert sunlight into energy, supporting processes such as growth, flowering, and fruiting. When a plant is in its optimal range, it can maximize its photosynthetic activity and nutrient uptake, leading to robust growth and resilience against stresses, such as pests or environmental changes. In terms of light exposure, this means that the plant receives an adequate amount of sunlight without being overexposed, which could lead to photoinhibition or damage. Options referring to the limits of tolerance or the zones of stress indicate conditions that are either too extreme or stressful for the plant. The photosynthetic limit suggests a point at which the plant can no longer efficiently utilize light, which also does not promote optimal growth. Therefore, placing a plant within its optimal range is the best strategy to ensure it thrives in a greenhouse setting.