

PYQ-NEET Practice Exam (Sample)

Study Guide



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SAMPLE

Questions

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- 1. Which ecosystem is characterized by low stability and high resilience?**
 - A. Tundra**
 - B. Coral reef**
 - C. Wetlands**
 - D. Grassland**
- 2. Which type of plant relies on animal vectors for pollination?**
 - A. Cucumber**
 - B. Wheat**
 - C. Rice**
 - D. Barley**
- 3. What characterizes a carcinoma?**
 - A. A benign tumor found in connective tissue**
 - B. A malignant tumor that occurs in epithelial tissue**
 - C. A tumor that is always operable**
 - D. A tumor that grows slowly and is non-invasive**
- 4. How many ovules are found in each ovary of wind-pollinated flowers?**
 - A. 1 ovule**
 - B. 2 ovules**
 - C. 3 ovules**
 - D. No ovules**
- 5. What is the pH range of a neutral solution?**
 - A. 5**
 - B. 6**
 - C. 7**
 - D. 8**

- 6. How many chambers does the human heart have?**
- A. Two**
 - B. Three**
 - C. Four**
 - D. Five**
- 7. Which class of enzymes catalyzes hydrolysis reactions?**
- A. Ligases**
 - B. Hydrolases**
 - C. Isomerases**
 - D. Transferases**
- 8. What is the function of hemoglobin in red blood cells?**
- A. Carbon dioxide transport**
 - B. Oxygen transport**
 - C. Nutrient absorption**
 - D. Waste removal**
- 9. What is the correct sequence of phases in a mitotic cycle?**
- A. G1, S, G2, M**
 - B. M, G2, S, G1**
 - C. S, G1, M, G2**
 - D. G2, M, G1, S**
- 10. What is the viability duration for pollen mentioned in the context provided?**
- A. 15 minutes**
 - B. 30 minutes**
 - C. 1 hour**
 - D. 24 hours**

Answers

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

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Explanations

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1. Which ecosystem is characterized by low stability and high resilience?

- A. Tundra**
- B. Coral reef**
- C. Wetlands**
- D. Grassland**

The grassland ecosystem is characterized by low stability and high resilience due to its dynamic nature and adaptability to various environmental changes. Grasslands experience fluctuating conditions, such as changes in precipitation and temperature, which can lead to periods of drought or excessive rainfall. Despite these disturbances, grassland communities are resilient, meaning they can recover relatively quickly from adverse conditions due to their deep root systems and the ability of many grass species to sprout anew from their roots after being damaged. This resilience allows grasslands to bounce back from disturbances, such as grazing or fire, making them adaptable to a range of conditions while potentially struggling to maintain a stable composition of species. In contrast, other ecosystems such as tundra, coral reefs, and wetlands may display different levels of stability and resilience. For instance, coral reefs typically have a high degree of stability due to the delicate balance of their biodiversity and symbiotic relationships, but are also susceptible to environmental stresses such as climate change, which can disrupt their stability. Tundra ecosystems are often stable but may have low resilience to rapid changes, while wetlands exhibit unique stabilizing properties that support both biodiversity and ecological functions. Thus, the grassland's features of low stability paired with high resilience make it the focal point of this question.

2. Which type of plant relies on animal vectors for pollination?

- A. Cucumber**
- B. Wheat**
- C. Rice**
- D. Barley**

Cucumber is a type of plant that relies on animal vectors for pollination, particularly insects such as bees and butterflies. These animals are attracted to the flowers of the cucumber plant, which produce nectar and have bright colors, making them visible and appealing to pollinators. When these insects visit the flowers to collect nectar, they inadvertently transfer pollen from one flower to another, facilitating the reproductive process necessary for the production of fruits and seeds. In contrast, grains like wheat, rice, and barley are primarily pollinated by the wind. These plants have evolved to produce a large amount of lightweight pollen that can be readily carried by air currents. They do not have the same need for animal interactions for pollination, as their reproductive strategy is geared towards wind dispersal rather than attracting animals. Therefore, the cucumber's reliance on animal vectors distinguishes it from the other options listed.

3. What characterizes a carcinoma?

- A. A benign tumor found in connective tissue
- B. A malignant tumor that occurs in epithelial tissue**
- C. A tumor that is always operable
- D. A tumor that grows slowly and is non-invasive

A carcinoma is characterized as a malignant tumor that arises from epithelial tissue, which includes cells that line the surfaces of organs and structures throughout the body. This distinction is crucial because carcinomas can infiltrate surrounding tissues and spread to other parts of the body (metastasize), highlighting their aggressive nature compared to benign tumors, which do not invade adjacent tissues. Epithelial tissue is the largest type of tissue in the body, forming the skin, and lining internal organs and cavities, making carcinomas a common form of cancer. The processes of uncontrolled cell growth and the ability to metastasize are what primarily differentiate carcinomas from benign tumors. In contrast, benign tumors, such as those found in connective tissue, do not exhibit malignant characteristics and are generally localized. Additionally, not all tumors, including carcinomas, are always operable - the operability can depend on various factors including the size, location, and extent of the disease. Lastly, many malignant tumors, including carcinomas, tend to grow rapidly and can be invasive, making them quite different from the characteristic slow growth and non-invasive nature of benign tumors.

4. How many ovules are found in each ovary of wind-pollinated flowers?

- A. 1 ovule**
- B. 2 ovules
- C. 3 ovules
- D. No ovules

In wind-pollinated flowers, typically, there is one ovule found in each ovary. This arrangement is an adaptation that enhances the efficiency of wind pollination. Having a single ovule allows these plants to produce larger, lighter seeds that can be easily dispersed by the wind over longer distances. This reproductive strategy is particularly advantageous in environments where pollinators are scarce or inconsistent. In contrast, other flowers, particularly those that rely on pollinators, might have multiple ovules within the same ovary to increase the likelihood of fertilization and enhance seed production. Wind-pollinated flowers, however, have evolved to maximize the chances of successful fertilization with this streamlined ovule count. Thus, one ovule per ovary not only optimizes resource allocation but also supports a reproductive strategy that aligns with their mode of pollination.

5. What is the pH range of a neutral solution?

- A. 5
- B. 6
- C. 7**
- D. 8

A neutral solution is defined as one where the concentration of hydrogen ions (H^+) is equal to that of hydroxide ions (OH^-). At standard temperature ($25^\circ C$), this equilibrium state occurs at a pH of 7. This value of 7 indicates that the solution is neither acidic nor basic. In terms of the pH scale, which ranges from 0 to 14, anything below 7 is considered acidic, and anything above 7 is considered basic (alkaline). Therefore, a pH of 7 is the hallmark of neutrality in an aqueous solution. This crucial understanding is foundational in chemistry as it relates to acid-base balance and is especially important in biological systems. Other values on the pH scale, whether they are 5, 6, or 8, represent acidic or alkaline conditions but do not signify neutrality. As such, the selected answer of 7 accurately captures the pH level indicative of a neutral solution.

6. How many chambers does the human heart have?

- A. Two
- B. Three
- C. Four**
- D. Five

The human heart has four chambers, which consist of two atria and two ventricles. This structure is crucial for efficiently pumping blood throughout the body. The right atrium receives deoxygenated blood from the body and pumps it into the right ventricle, which then sends the blood to the lungs for oxygenation. Meanwhile, the left atrium receives oxygenated blood from the lungs and transfers it to the left ventricle. The left ventricle has the critical job of pumping oxygen-rich blood to the rest of the body. This four-chamber arrangement allows for the separation of oxygenated and deoxygenated blood, enabling more effective circulation and oxygen delivery to tissues, essential for sustaining life.

7. Which class of enzymes catalyzes hydrolysis reactions?

- A. Ligases
- B. Hydrolases**
- C. Isomerases
- D. Transferases

Hydrolases are the class of enzymes specifically responsible for catalyzing hydrolysis reactions, which involve the breakdown of complex molecules into simpler ones through the addition of water. This process typically results in the cleavage of chemical bonds, often leading to the formation of two or more products from a single reactant. Hydrolases play vital roles in various biological processes, such as digestion, where enzymes like amylase help break down carbohydrates into their sugar constituents, or proteases that digest proteins into amino acids. Their function is crucial in metabolic pathways where the modification of biomolecules occurs via the addition of water. The other enzyme classes mentioned have distinct roles: ligases catalyze the joining of two molecules with the simultaneous hydrolysis of a high-energy bond (like ATP), isomerases facilitate the rearrangement of atoms within a molecule without adding or removing elements, and transferases move a functional group from one molecule to another. Each of these classes serves unique functions in biological processes that do not specifically involve hydrolysis, thereby highlighting why hydrolases are the appropriate choice for catalyzing hydrolysis reactions.

8. What is the function of hemoglobin in red blood cells?

- A. Carbon dioxide transport
- B. Oxygen transport**
- C. Nutrient absorption
- D. Waste removal

Hemoglobin serves a vital role in the transport of oxygen within red blood cells. It is a specialized protein that binds to oxygen in the lungs, where oxygen concentration is high, and releases it in tissues where the concentration is lower, allowing for efficient delivery to cells throughout the body. This ability to carry oxygen is crucial for cellular processes that require it for energy production. While carbon dioxide transport is another function of red blood cells, hemoglobin primarily facilitates the uptake and release of oxygen. Nutrient absorption and waste removal are not functions attributed to hemoglobin; instead, they involve different biological mechanisms and systems in the body. Hemoglobin's specific role in oxygen transport is fundamental to maintaining the body's overall metabolism and energy levels.

9. What is the correct sequence of phases in a mitotic cycle?

A. G1, S, G2, M

B. M, G2, S, G1

C. S, G1, M, G2

D. G2, M, G1, S

The correct sequence of phases in the mitotic cycle is G1, S, G2, and M. In the G1 phase (Gap 1), the cell grows and synthesizes proteins necessary for DNA replication. It also undergoes metabolic processes that prepare the cell for DNA synthesis. Following G1, the S phase (Synthesis) occurs where DNA replication takes place, resulting in the duplication of the chromosomes. After DNA replication, the G2 phase (Gap 2) follows, where the cell continues to grow, produce proteins, and prepare for mitosis. This phase is crucial for ensuring the cell is ready to divide. Finally, the M phase (Mitosis) is where the actual division occurs, resulting in two daughter cells. This orderly progression ensures that each phase is completed before the cell transitions to the next phase, allowing for proper cellular function and division. The other sequences provided do not align with this established understanding of the cell cycle, as they do not follow the logically sequenced flow from growth to replication to preparatory processes and finally to division.

10. What is the viability duration for pollen mentioned in the context provided?

A. 15 minutes

B. 30 minutes

C. 1 hour

D. 24 hours

The correct answer highlights that pollen viability typically lasts around 30 minutes. Pollen viability refers to the period during which pollen grains remain alive and capable of fertilization after being released from the anthers of the flower. This duration can be crucial for successful fertilization, as it determines the window during which pollen can effectively germinate and guide the growth of the pollen tube towards the ovule. In many plant species, pollen grains hydrate upon contact with the stigma and begin the germination process. However, they can only do so effectively within their viability window. While some species may have slightly longer or shorter viability times, the 30-minute timeframe is a widely accepted average for a variety of plants, particularly in controlled environments. Understanding this timeline can be essential for practices such as pollination in agriculture and botanical studies.