

Advanced Agriculture Concepts

Agriculture · Answer Key · 18 Questions

1. What is the primary biological process that allows leguminous plants to fix atmospheric nitrogen into a usable form for themselves and other plants?

- A) Photosynthesis
- B) Respiration
- C) Nitrification
- D) Symbiotic nitrogen fixation by Rhizobium bacteria**

2. In precision agriculture, what technology is most commonly used to create detailed maps of field variability for targeted fertilizer or pesticide application?

- A) Spectroscopy
- B) GPS and GIS**
- C) Drones with thermal imaging
- D) Soil moisture sensors

3. Which soil horizon is characterized by the accumulation of leached minerals like clay, iron oxides, and aluminum, often appearing lighter in colour?

- A) O horizon (organic matter)
- B) A horizon (topsoil)
- C) B horizon (subsoil or illuvial layer)**
- D) C horizon (parent material)

4. Hydroponics is a method of growing plants without soil. What essential nutrient is often omitted or significantly reduced in hydroponic nutrient solutions because it is readily available in dissolved oxygen?

- A) Potassium
- B) Nitrogen
- C) Phosphorus
- D) Carbon**

5. The Green Revolution, beginning in the mid-20th century, significantly increased global agricultural production. What was a key technological innovation associated with it?

- A) Genetically modified organisms (GMOs)
- B) Development of high-yield crop varieties**
- C) Widespread adoption of no-till farming
- D) Introduction of synthetic fertilizers

6. What is the term for the practice of cultivating crops and raising livestock on the same land simultaneously, aiming for a more integrated and sustainable system?

- A) Monoculture
- B) Crop rotation
- C) Polyculture**
- D) Intercropping

7. Which type of pesticide is specifically designed to target and kill fungi that cause plant diseases?

- A) Herbicide
- B) Insecticide
- C) Fungicide**
- D) Rodenticide

8. The Cantareira Water System, one of the largest urban water supply systems in the world, faces significant challenges due to agricultural runoff. What is a major pollutant from agriculture that can contribute to eutrophication of water bodies?

- A) Heavy metals
- B) Sediments
- C) Nitrates and phosphates**
- D) Pesticides

9. What is the primary role of mycorrhizal fungi in the soil ecosystem regarding plant nutrition?

- A) Decomposing organic matter
- B) Fixing atmospheric nitrogen
- C) Enhancing nutrient uptake (especially phosphorus) by plant roots**
- D) Protecting plants from soil-borne pathogens

10. Integrated Pest Management (IPM) is a sustainable approach to managing pests. Which of the following is a core principle of IPM?

- A) Exclusive reliance on chemical pesticides
- B) Using a combination of biological, cultural, and chemical tactics**
- C) Prioritizing synthetic fertilizers
- D) Eliminating all insect populations

11. What is the specific term for the process of applying a beneficial microorganism to a plant or soil to enhance plant growth and health?

- A) Biopesticide
- B) Biofertilizer**
- C) Bioremediation
- D) Biotechnology

12. Silage is a type of fermented fodder used as animal feed. What is the primary objective of the ensiling process?

- A) To dry out the forage completely
- B) To preserve forage by converting sugars into lactic acid**
- C) To increase the protein content
- D) To remove all moisture

13. What is the primary difference between conventional tillage and conservation tillage (e.g., no-till or minimum till)?

- A) Conventional tillage uses more water.
- B) Conservation tillage leaves more crop residue on the soil surface.**
- C) Conventional tillage is more effective at weed control.
- D) Conservation tillage requires heavier machinery.

14. The Bt gene, commonly used in genetically modified crops, confers resistance to certain insects. What is the source of this gene?

- A) A bacterium**
- B) A virus
- C) A fungus
- D) Another plant species

15. What does the term 'agroforestry' describe?

- A) The science of soil composition
- B) The integration of trees and shrubs into farming systems**
- C) The study of insect behavior in agriculture
- D) The management of water resources for irrigation

16. Which of the following is a primary function of earthworms in agricultural soils?

- A) To suppress weed growth
- B) To aerate the soil and improve its structure**
- C) To directly provide nitrogen to plant roots
- D) To break down complex organic matter into simple sugars

17. What is the main challenge posed by soil salinization in agriculture?

- A) Increased soil fertility
- B) Reduced water availability for plant uptake**
- C) Enhanced nutrient leaching
- D) Promoted microbial activity

18. What is the primary mechanism by which drip irrigation conserves water compared to flood irrigation?

A) It increases evaporation rates.

B) It delivers water directly to the plant roots, minimizing runoff and evaporation.

C) It requires a higher flow rate.

D) It saturates the entire soil profile evenly.