

Advanced Horticultural Science

Horticulture · Answer Key · 20 Questions

1. Which phytohormone is primarily responsible for the induction of stomatal closure in response to water stress?

- A) Auxin
- B) Gibberellin
- C) Absciscic acid**
- D) Cytokinin

2. What is the precise term for the process where plants convert atmospheric nitrogen into ammonium by the enzyme nitrogenase in symbiotic relationships?

- A) Nitrification
- B) Denitrification
- C) Nitrogen fixation**
- D) Ammonification

3. In plant tissue culture, which plant growth regulator ratio typically promotes root organogenesis over shoot formation?

- A) High auxin to low cytokinin**
- B) High cytokinin to low auxin
- C) Equal concentrations of auxin and cytokinin
- D) High gibberellin to low auxin

4. The 'crassulacean acid metabolism' (CAM) pathway is a physiological adaptation primarily designed to maximize which efficiency?

- A) Photosynthetic photon flux density
- B) Water-use efficiency**
- C) Nitrogen uptake
- D) Respiration rate

5. What is the function of the Casparian strip in the primary root endodermis?

- A) Providing structural support to xylem vessels
- B) Facilitating symplastic transport of nutrients
- C) Preventing apoplastic flow into the vascular cylinder**
- D) Synthesizing secondary metabolites

6. Which mineral element is a core component of the chlorophyll molecule's porphyrin ring?

- A) Iron
- B) Magnesium**
- C) Manganese
- D) Copper

7. What defines the phenomenon of 'apical dominance' in plants?

- A) The inhibition of lateral bud growth by the shoot apex**
- B) The rapid vertical growth of roots over shoots
- C) The dominance of flower production over vegetative growth
- D) The preferential allocation of sugar to the fruit

8. Which specialized type of cell division leads to the formation of the vascular cambium in woody perennials?

- A) Periclinal division**
- B) Anticlinal division
- C) Meiosis
- D) Endoreduplication

9. What is the primary mechanism of action for the herbicide Glyphosate?

- A) Inhibition of photosystem II
- B) Inhibition of the EPSP synthase enzyme**
- C) Disruption of microtubule assembly
- D) Induction of ethylene production

10. Which wavelength range of light is most effectively absorbed by chlorophyll pigments during photosynthesis?

- A) 500-550 nm (Green)
- B) 600-700 nm (Red)**
- C) 750-850 nm (Far-red)
- D) 300-350 nm (UV)

11. What is the term for the movement of phloem sap from 'source' tissues to 'sink' tissues, as described by the Münch pressure-flow hypothesis?

- A) Translocation**
- B) Transpiration
- C) Diffusion
- D) Imbibition

12. In soil science, what is the 'cation exchange capacity' (CEC) a measure of?

- A) The total water-holding capacity
- B) The soil's ability to retain and exchange positively charged nutrients**
- C) The concentration of hydrogen ions in the soil solution
- D) The total carbon content of the soil

13. Which type of pathogen causes 'damping-off' disease in seedlings, characterized by the decay of the stem near the soil line?

- A) Oomycetes (e.g., Pythium)**
- B) Viruses (e.g., TMV)
- C) Nematodes
- D) Bacteria

14. What is the role of vernalization in plant development?

- A) Inducing flowering through exposure to cold temperatures**
- B) Accelerating seed germination through desiccation
- C) Enhancing fruit ripening through ethylene release
- D) Increasing secondary root density through pruning

15. Which plant pigment is responsible for perceiving the red/far-red light ratio, thereby regulating shade avoidance responses?

- A) Carotenoid
- B) Phytochrome**
- C) Anthocyanin
- D) Flavonoid

16. What is the primary role of the 'S-locus' in many flowering plants?

- A) Determining fruit color
- B) Regulating self-incompatibility**
- C) Controlling flower scent
- D) Increasing pollen tube growth speed

17. In plant propagation, what is a 'chimera' specifically defined as?

- A) A plant with two or more genetically distinct cell layers**
- B) A hybrid cross between two different genera
- C) A genetically modified organism containing foreign DNA
- D) A mutant lacking chlorophyll in all cells

18. Which nutrient deficiency typically manifests as interveinal chlorosis on older leaves first?

- A) Calcium
- B) Nitrogen**
- C) Iron
- D) Boron

19. What is the scientific term for the loss of water vapor through the stomata of plant leaves?

- A) Guttation
- B) Transpiration**
- C) Evaporation
- D) Respiration

20. Which anatomical feature allows for gas exchange in the periderm of woody stems?

- A) Stomata
- B) Lenticels**
- C) Hydathodes
- D) Trichomes