

Name: \_\_\_\_\_

25 points

## A. Multiple choice section (1 point each, 5 points total)

1. Which one of the following is unique to gymnosperm leaves?

- a. sunken stomates
- b. endodermis
- c. transfusion tissue
- d. palisade layer
- e. minor veins

2. The bundle sheath in an angiosperm minor vein

- a. prevents air from penetrating into the xylem
- b. helps to concentrate and load photosynthates
- c. may be enlarged and contain chloroplasts
- d. may be parenchymatic or sclerenchymatic
- e. may do, or have, any of the above

3. Anatomically, C<sub>4</sub> photosynthesis is associated with

- a. the absence of a bundle sheath
- b. large intercellular spaces in the mesophyll
- c. absence of chloroplasts in the spongy parenchyma
- d. enlarged bundle sheath cells containing chloroplasts
- e. enlarged bundle sheath cells lacking chloroplasts

4. Which one of the following adaptations is not likely to occur in plants of aquatic habitats?

- a. aerenchyma
- b. highly dissected leaves
- c. reduction of xylem
- d. multiseriate epidermis
- e. presence of chloroplasts in leaf epidermal cells

5. Which one of the following statements about dicot leaf development is false?
- \_\_\_ a. The most mature lateral veins in a developing dicot leaf will be at the apex.
  - \_\_\_ b. The number of cell layers in a dicot leaf lamina is determined by the plate meristem.
  - \_\_\_ c. Minor veins in a dicot leaf develop basipetally and from the margin inward.
  - \_\_\_ d. Cell division stops first in the adaxial epidermis, then in the abaxial epidermis and spongy mesophyll, and last in the palisade parenchyma.
  - \_\_\_ e. In a monocot leaf, the primary veins mature acropetally.

B. Short answer section (13 points total)

6. Diagram and label a cross-sectional view of a portion of a terrestrial dicot leaf including one vascular bundle. Include cellular detail in a sector of your diagram (but you don't have to draw in cells in the whole thing). 6 points

7. What is the most consistent way to distinguish monocot leaves from dicot leaves? List two other ways in which monocot and dicot leaves usually differ. 3 points

8. What are barrier cells and what function do they serve? What other structure in certain plant organs has a similar function? 4 points

C. Laboratory practical section (1 point each, 7 points total). Answer as specifically as the evidence allows.

9. The structure indicated is known as a(n) \_\_\_\_\_.
10. Which meristem is active in the area indicated? \_\_\_\_\_.
11. Is this plant  $C_3$  or  $C_4$ ? \_\_\_\_\_
12. What kind of secretory structure is this? \_\_\_\_\_.
13. This trichome would be described as \_\_\_\_\_.
14. The structure indicated is a(n) \_\_\_\_\_.
15. In this conifer leaf, these cells are \_\_\_\_\_.

Extra Credit (1 point)

This zone is a \_\_\_\_\_.