

**GUIDELINES FOR FINAL EXAMINATION**

**I. Exam Time:** 1:00-3:00 p.m., Wednesday, May 7, 2008.

**II. II. COMPOSITION**

The final exam (100 points, 50 questions) will be composed of multiple-choices, short answers, and matching- type questions.

**III. SUGGESTED AREAS OF STUDY**

**A. Old Materials:** One or two questions from each chapter (chapter 1 through chapter 11)

**B. Principles of Grafting and Budding** (Chapter 11, Lectures)

- a. Advantages of using grafting and budding over other propagation methods.
- b. Discuss how grafting methods can be used to maintain certain clonal materials that can not be seed propagation.
- c. What are the benefits of using root stocks?
- d. What is meant by an interstock and why is it used?
- e. Describe benefits and methods of using seedling plants in grafting.
- f. What is topworking and why is it used?
- g. How a topworking can be used to induce fruit set in pistillate plants of a dioecious species.
- h. Show, with an example, how grafting can be used to shorten time from tree planting to flowering and fruiting.
- i. Describe how approach grafts and bridge grafts are used to repair damaged trees.
- j. Describe how a grafting method can be used to detect virus for symptomless carriers.
- k. Explain the sequence of healing events taking place at the graft union following the joining of scion and stock.

**C. Techniques of Grafting** (Chapter 12, Lectures)

1. Discuss three different types of incompatibility that lead to failure in grafting.
2. Show how the use of interstock can overcome incompatibility between stock and scion.
3. Discus each of the five requirements that have to be met in successful grafting.
4. Describe, with illustration, the method of whip-and-tongue grafting.
5. Describe, with illustration, the method of splice grafting.
6. Describe, with illustration, the method of side grafting.
7. What is meant by side-veneer graft and where is it used?
8. Distinguish the difference between cleft graft and wedge graft with illustrations.
9. Show how a bark graft is made.
10. Describe the difference between approach graft and inarching.
11. Show problems that might be encountered by topworking of fruit trees.

**D. Techniques of Budding** (Chapter 13, Lectures)

1. List and explain each of the five requirements for successful budding.
2. Advantages and disadvantages of budding as compared to grafting.

3. When is the best time of year for budding?
4. Best time for budding can be in the fall, spring or summer. What determines the time of budding?
5. Contrast the T-budding vs. the inverted T-budding and explain why the inverted T-budding is practiced.
6. Explain the patch budding with an illustration.
7. Using a drawing, show the difference between flute budding and ring budding.
8. What is a chip budding? How does it differ from the T-budding?
9. What is meant by topbudding and when is it used?
10. What is meant by 'double-working by budding' how is it accomplished?
11. What is meant by microbudding and micrografting and why are they practiced?
12. Describe differences between the grafting of woody plants and the herbaceous grafting.
13. Show and explain examples of the herbaceous grafting method used in horticulture.

#### **E. Layering and Its Natural Modifications (Chapter 14, Lectures)**

1. What is meant by layering?
2. Describe five factors that affect the success of layering.
3. Why is layering used instead of other means of propagation?
4. What are the disadvantages of practicing layering in plant propagation?
5. Explain, with illustrations, six different types of layering used in horticulture: tip layering, simple layering, serpentine layering, air layering, mound layering, trench layering.
6. Give names of plants that can be propagated by each of the six different layering methods.

#### **F. Principles and Practices of Clonal Selection (Chapter 16, Lectures)**

1. What are the advantages of vegetative propagation over seed propagation?
2. Why are apples, pears and peaches commonly propagated by grafting rather than by cutting?
3. Show, with gene symbols, how asexual propagation differs from seed propagation in the segregation of certain traits.
4. What would you expect if 'Red Delicious' apple and 'Bartlett' pear are propagated by seed?
5. What would be the disadvantage of monoclonal plantations?
6. Show how you can shorten time required from planting to maturity by vegetative propagation.
7. Know how long it takes to flower orchids from seed and from protocorm culture.
8. Define, with illustration if necessary, the following terms used in vegetative propagation: ramet, ortet, true-to-type, off-type.
9. Contrast genetic variation vs. epigenic variation.
10. What is meant by phenotypic variation and periphysis?
11. What is cyclophysis? Define homoblastic phase change and heteroblastic phase change.
12. Draw a mature tree and designate the relative degree of juvenility and maturity on different parts of the tree.
13. Show how the 'hormonal exhaustion' concept for the cause of juvenility can be demonstrated by certain grafting combinations of *Hedera helix* (English ivy).
14. Suggest ways by which plants can be rejuvenated.
15. What is meant by topophysis? Explain it with an example.
16. List four different types of changes that cause mutations in plants.
17. Contrast point mutation vs. chromosomal changes.
18. What is a sport and how does it occur?
19. List causal agents for mutation induction.
20. Define a chimera.
21. Why is the origin of chimera always traced back to the meristematic growing point?
22. Draw the longitudinal section of the meristematic region and show the location of the four different histogenic layers ( $L_1$ ,  $L_2$ ,  $L_3$ ,  $L_4$ ).

23. Know which parts (epidermis, gametes, roots, internal tissues) will show mutant characteristics if genetic changes occurred in a meristem at different histogenic layers.
24. Why are certain plants of periclinal chimera not visually detectable?
25. Contrast chimera and plants of genetic variegation caused by transposable elements (jumping genes).
26. Illustrate and explain how one can construct a chimeric plant by grafting.
27. Show how a virus infected plant can be 'cleaned.'
28. Why is tissue culture used as a means of eliminating viruses?