GUIDELINES FOR EXAMINATION II

I. Composition

1. Essay questions (8 questions, 5 points each).................................................. 40 points
2. Short answers, matching or fill-in type (14 questions, various points)........... 40 points
3. Multiple choice and true/false (10 questions, 2 points each)......................... 20 points

Total            100 points

II. Suggested Areas of Study

A  Principles of Propagation by Seed (Chapter 7, lecture notes)

1. Discuss the processes involved in each of the three stages of seed germination.
2. Reasons why the synthesis of enzymes must proceed the germination of seed.
3. Illustrate the morphology of a germinating seed showing cotyledons, endosperm tissues, embryo axis, plumule and radicle.
4. Contrast hypocotyl and epicotyl.
5. Explain the difference between epigeous germination and hypogeous germination with examples.
6. Know the difference between viability, germinability and vigor as they relate to seed propagation.
7. Contrast dormancy vs. quiescence.
8. Explain 3 different types of seed dormancy: ecodormancy, paradormancy and endodormancy.
9. Contrast primary seed dormancy and secondary seed dormancy.
10. Explain the two different types of seed coat dormancy: physical and mechanical.
11. What is meant by chemical dormancy and morphological dormancy?
13. What is meant by stratification and how is it used to overcome embryo dormancy?
14. What is meant by epicotyl dormancy?
15. Briefly outline the function of GA<sub>3</sub> during the germination of a corn seed.
16. Discuss the function of abscisic acid (ABA) in the onset of primary dormancy.
17. List crops that are cool-temperature requiring and warm-temperature requiring during seed germination.
18. Why is aeration required by germinating seeds?

B.  Methods of Seed Propagation (Chapter 8, lecture notes)

1. List four parameters used in seed testing?
2. List four different ways by which seed viability is determined and explain each with examples.
3. Why does a red color develop in the viable seed tissues when they are exposed to triphenyl tetrazolium chloride (TTC) during water imbibition?
4. Discuss three different ways of scarifying seeds.
5. What type of seed dormancy is overcome by scarification?
6. Outline the procedures of stratifying deciduous woody plant seeds by refrigeration.
7. Discuss the natural way of stratifying seeds using the outdoor planting procedure.
8. List growth regulators and other chemical stimulants used to enhance seed germination.
9. What is meant by seed priming?
10. Outline procedures for priming seeds by an osmotically adjusted solution and organic solvent infusion method.
11. Describe how seeds can be protected against pathogens: use of disinfectants, disinfectants, protectants.
12. Define 4 different stages of seedling development in plug production

C. Principles of Propagation by Cuttings (Chapter 9, Lectures)

1. What is meant by totipotency?
2. What is meant by dedifferentiation?
3. What is an adventitious root?
4. Four stages of de novo adventitious root formation.
5. Describe how roots form in response to wounding.
6. Draw a cross section of a herbaceous plant stem and show vascular bundles, cortex tissue and sites of adventitious root initiation.
7. Draw a cross section of a woody stem and indicate the site of adventitious root primordia formation.
8. Relationship between callusing and adventitious root formation.
10. Name plants that can be propagated by leaf cuttings with primary meristems.
11. Know three plants that can be propagated by leaf cuttings via secondary meristems.
12. Site of bud formation on root cuttings.
13. Why some plants generated from root cuttings show a mutant phenotype more readily than those generated form stem cuttings?
14. How can you demonstrate there is a polarity effect on rooting cuttings?
15. Define a phytohormone and a plant growth regulator.
16. Know the functions of auxins, cytokinins, gibberellins, abscisic acid and ethylene in rooting of cuttings.
17. List three different auxin compounds and show their relative stability.
18. Know names of a natural cytokinin, and two synthetic cytokinins.
19. How can you demonstrate the fact that buds present a stem cutting stimulates rooting and that auxin is involved in root formation.
20. Know factors that affect the success of cutting: environmental, physiological, timing and plant materials.

D. Techniques of Propagation by Cuttings (Chapter 10, Lectures)

1. Know the advantage and proper time of using hardwood cuttings in plant propagation.
2. Know the types of hardwood cuttings: straight, heel, mallet.
3. Contrast the difference between semi-hardwood cutting and softwood cutting.
4. Reason why the presence of leaf on herbaceous cuttings is beneficial.
5. Describe, with illustration, procedures for propagating African violets by leaf cutting.
6. What is meant by single-eye nodal cuttings and double-eye nodal cuttings?
7. Know the directions of distal and proximal ends in the stem and root cuttings.
8. Name 5 plants that can be propagated by root cuttings.
9. Discuss how stock plants can be manipulated in order to enhance rooting of cuttings obtained from them.
10. Know proper conditions for rooting media.
11. List 3 plants that respond well to wounding during cutting propagation.
12. Illustrate the procedure for preparing a one-liter solution of 2,000 ppm IBA in 50% ethanol.
13. Advantages and disadvantages of using the powder and liquid forms of rooting hormone.
14. Know different methods of rooting hormone application for cutting: a) use of powder form, b) the quick-dip method, c) soaking, d) tooth-pick method.
15. Procedures for using surface disinfectants and fungicides during cutting propagation.
16. Why is bottom heat beneficial during cutting propagation?
17. Discuss the advantages and disadvantages of the mist systems and fogging system in cutting propagation.
18. List two algicides used in cutting propagation.
19. What do you know about fertilizer requirements during cutting propagation?

E. **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 propagated.
   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.

B. **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. Discuss 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.